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For additional Slides on all the above subjects see Index.

ARA

ETON NATURE STUDY.

Nowadays, when Nature Study is being largely taken up in our principal schools, we have thought that it would be useful to publish a series of Slides taken from "Eton Nature Study" by MATTHEW DAVENPORT HILL, M.A., F.Z.S., Assistant Master at Eton College, and WILFRED MARK WEBB, F.L.S., F.R.M.S. (5s. net., DUCKWORTH AND CO.) Many of them are from direct photographs, but a large number are from most beautiful and careful drawings by W. J. WEBB.

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- 1 A specimen left-hand page of the note-book, on which headings and notes have been written.
- 2 A specimen right-hand page of the note-book, on which outline diagrams and water-colour sketches have been made.
- 3 Map showing the method of recording observations by use of flag labels.
- 4 A plum cut through, and showing the seed laid bare by the removal of part of the stone.
- 5 Development of a dwarf Bean Pod.
 - 6 Fruit of Caper Spurge.
 - 7 Ripened fruit of Caper Spurge bursting and scattering its seeds.
 - 8 The fruits of Robin-run-in-the-hedge.
 - 9 The head of Burdock.
 - 10 Fruit of Barley Grass.
 - 11 Fruit of Goat's Beard.
 - 12 The fruit of "Old Man's Beard."
 - 13 The fruit of Crane's-bill.
- 10 A glass-topped box containing fruits of Willow Herb.
- 11 Swallows collecting round a tower, near Redhill, before migrating.
- 12 Barn Swallows returning in pairs and landing on the Isle of Wight.
- 13 Apparatus for observing the sun.
 - 14 Part of apparatus for observing the sun.
 - 15 A Window showing the method of recording the height of the sun.
 - 16 Diagram to show the position of the sun on the longest and shortest days.
- 16 Records of the position of a shadow on the floor.
 - 17 Flower of a dwarf bean.
 - 18 Flower of a dwarf bean from which the petals have been removed.
 - 19 Young seed pod of a dwarf bean.
 - 20 Shadow cast at noon by an erect rod.
 - 21 Shadow cast at noon by a tilted rod.
 - 22 A figure showing the connection between the angle made by style of a sun-dial, and that representing the latitude of place where it is used.
 - 23 A figure showing one method of determining latitude.
 - 24 A figure showing how to cut out the style for a paper model sun-dial.
 - 25 A Sun-dial; seen from above.
 - 26 A Sun-dial; seen from below.
 - 27 Clouds. Cumulus indicative of approaching showers.
 - 28 Clouds. Stratus pointing to fine weather.
 - 29 A Sea Anemone expanded.
 - 30 A Sea Anemone contracted.
 - 31 A marine aquarium kept without changing the water for many years.
 - 32 Back of an ordinary edible crab.
 - 33 Underside of an ordinary edible crab (female).
 - 34 The tail of a female edible crab extended to show the swimmerets.
 - 35 Web of a garden spider.
 - 36 House spider.
 - 37 Garden spider.
 - 38 A leaf scar on a sycamore twig.
 - 39 Diagram showing the leaf arrangement of sycamore.
- 37 Spindle Tree leaf.
- 38 Dogwood leaf.
- 39 Wayfaring Tree leaf.
- 40 Lesser Maple leaf.
- 41 Greater Maple leaf.
- 42 Guelder Rose leaf.
- 43 Horse Chestnut leaf.
- 44 Elder leaf.
- 45 Ash leaf.
- 46 Lime leaf.
- 47 Common Elm leaf.
- 48 Wych Elm leaf.
- 49 Plane leaf.
- 50 Spanish Chestnut leaf.
- 51 Birch leaf.
- 52 Alder leaf.
- 53 Beech leaf.
- 54 Hazel leaf.
- 55 Hornbeam leaf.
- 56 Walnut leaf.
- 57 Blackthorn leaf.
- 58 Bird Cherry leaf.
- 59 Wild Cherry leaf.
- 60 Crab Apple leaf.
- 61 Aspen leaf.
- 62 Black Poplar leaf.
- 63 White Willow leaf.
- 64 Oak leaf.
- 65 Wild Service leaf.
- 66 White Beam leaf.
- 67 White Thorn leaf.
- 68 White Poplar leaf.
- 69 Mountain Ash leaf.
- 70 Holly leaf.
- 71 Scotch Pine leaf.
- 72 Larch leaf.
- 73 Yew leaf.
- 74 A common mould.
- 75 A portion of a mushroom bed.
- 76 A common cultivated mushroom.
- 77 A blind worm.
- 78 The hatching of a blind worm.
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- 82 A hedgehog.
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- 84 Wild cat and her kittens.
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- 86 A hybrid stoat ferret. This specimen was born with a stump tail.
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- 89 Mr. A. Heneage Cocks with one of his stoat-ferret hybrids.
- 90 The skeletons of man and horse compared.
- 91 A thoroughbred horse, "St. Simon."
- 92 A Shire horse, "Hiawatha."
- 93 Wild horses.
- 94 A hyacinth bulb cut through.
- 95 A hibernating humble-bee.
- 96 The edible snail and its winter lid.
- 97 Nest of a dormouse. 2s. 6d.
- 98 Oak log cut across.
- 99 Oak bark.
- 100 Bark of Spanish chestnut.
- 101 Section of Elder stem, showing the wide annual rings of wood and pith.
- 102 Section through a piece of Yew.

ETON NATURE STUDY—(Continued.)

- 78 Section through a piece of "stainy" Willow wood.
 79 Museum specimens and labels.
 80 A museum jar.
 81 Section of a railway cutting and limestone rocks near Ashbourne, Derbyshire.
 82 Sycamore twig.
 83 Valley showing the windings of the river which made it.
 84 Cross section of the stem of a cabbage.
 85 Section of a cabbage.
 86 Plane tree in winter.
 87 Methods of drawing trees.
 88 { Dwarf sugar bean. (Sutton's).
 { Bean with the skin removed.
 89 { Soaked bean beginning to shoot.
 { Soaked bean with one lobe removed.
 90 Skeleton leaf of Magnolia.
 91 Skeleton of an Indianrubber-Plant leaf.
 92 Young bean seedling.
 93 Bean seedling bursting skin of the seed.
 94 { Bean seedling kept in a tube supplied with air.
 { Bean seedling kept in closely corked tube.
 95 Development of the feathers of young Robin.
 96 { Potato tuber.
 { Developing "eye" of a Potato tuber.
 97 Geranium cutting.
 98 Young lily bulbs growing from an old scale.
 99 Begonia leaf producing new plants.
 100 Young bryophyllum plants growing from a detached leaf.
 101 Frog eggs.
 102 Crocus.
 103 { Trout egg.
 { Trout egg faintly "eyed."
 { Trout egg fully "eyed."
 104 Trout egg hatching.
 105 Newly hatched trout or "Allevin" showing the yolk sac.
 106 Young trout in the "fry" stage after the yolk sac has been absorbed.
 107 A Terrarium with accommodation for amphibious animals.
 108 Nest of the seven-spined Stickleback.
 109 Potato tuber showing "sprouts."
 110 { Frog's eggs, eight days old.
 { Frog's eggs, twelve days old.
 111 A developing chick, two days old.
 112 A closed-in nesting box.
 113 Nesting box with the side open.
 114 A series of chickens of the same brood at different ages showing the replacement of the downy covering by feathers.
 115 { Tadpole just hatched.
 { Tadpole—underside showing gills and mouth (three days hatching).
 116 A developing chick, three days old.
 117 Horse-chestnut buds.
 118 Potato showing young shoots.
 119 Horse-chestnut bud opening.
 120 Decaying vegetable matter pulled into the ground by a worm.
 121 An earthworm.
 122 { Tadpole, seven days old.
 { Tadpole showing the hind limb.
 { Tadpole showing the hind and fore limb.
 123 Horse-chestnut bud opening and showing a bunch of young flowers.
 124 { A pill wood-louse rolled up.
 { A pill wood-louse crawling.
 125 Centipede.
 126 Millipede.
 127 Lily bud
 128 Silkworm eggs.
 129 "May."
 130 A dried Fritillaria plant.
 131 A dried branch of Alder.
 132 Lily bud swelling.
 133 Drone bee.
 134 An observatory hive.
 135 A nucleus hive.
 136 { Egg of the honey-bee.
 { Larva of the honey-bee.
 137 Pupa of a drone in its cell.
 138 Humble-bee visiting Snapdragon.
 139 Lily bud about to open.
 140 A silkworm caterpillar.
 141 The blind wood-louse that lives in ants' nests
 142 A gallery in ants' nest with their "cows"
 143 An ant's "cow." underside.
 144 Lily bud opening.
 145 Lily flower.
 146 Privet hawk caterpillar showing the bands which "break" the surface of its body.
 147 A lobster caterpillar.
 148 { A hover-fly.
 { Egg of the hover-fly, enlarged.
 149 Larva of the hover-fly preying on aphides.
 150 A white butterfly.
 151 The common snail.
 152 The underside of a snail.
 153 The great grey slug.
 154 { A worm-eating slug.
 { Egg of a worm-eating slug.
 { Newly hatched worm-eating slug.
 { Egg of a worm-eating slug broken open to show the young one inside.
 155 { Spine of Hawthorn.
 { Spines of False Acacia.
 { Prickles of Wild Rose.
 { Gorse shoot.
 { Leaf-like branch of "Butcher's Broom," bearing a flower bud.
 156 { Fruit of "Butcher's Broom."
 { Section across a side wound in Ash branch.
 157 Side wound on an Ash branch.
 158 { Cross section of a recently made Apple graft.
 { Cross section through an Apple graft after a year's growth.
 159 { Maple tree in winter.
 { Maple tree in summer.
 160 A Bryony tendril.
 161 A Sundew leaf.
 162 A Sundew leaf feeding.
 163 Section showing how a side branch of Walnut joins another.
 164 { Marble gall showing the holes through which the insect inhabitants have escaped.
 165 { Marble gall cut through, showing the cavities occupied by the grub.
 166 { Marble gall-fly.
 { A "lodger" from a marble gall.
 167 Sheep's-wool galls on oak flowers.
 168 A "Robin's Cushion" on a rose shoot.
 169 A fairy fly.
 170 Succession of moorland vegetation on Redbourne Edge, Weardale.
 171 Wild hyacinths.
 172 Spore-capsule covers of the Male Fern.
 173 Silkworm chrysalis.
 174 Silkworm cocoon from which the moth has emerged.
 175 { Male silkworm moth.
 { Female silkworm moth.
 176 Moss showing capsules.
 177 Liver-wort.
 178 A Fern Prothallus.
 179 Eggs of a twin-spot lady-bird on the underside of a Hollyhock leaf.
 180 Larva of a lady-bird.
 181 Pupa of a lady-bird.
 182 Twin-spot lady-bird.
 183 Wild duck's nest covered.
 184 Wild duck's nest uncovered.
 185 Nearer view showing the eggs.
 186 Black-headed gull's nest and eggs.
 187 Black-headed gull's eggs hatching.
 188 Robin's nest.
 189 Young jackdaws.
 190 "The Eton Nature-Study Camera."

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- 18 Rabbit in the grass
- 19 Rabbiting with Ferret

- 22 Rat
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- 25 Mouse bones from Barn Owl casting
- 27 Dormouse
- 28 Mouse in trap
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- 32 Prairie dogs
- 33 Prairie dogs looking out of a hole, Leonardslee Park
- 34 Viper basking

- 35 Lizard
- 39 Stick Caterpillars (*Sambucata*)
- 44 Larvae of Pussmouth *D. vinula*
- 49 Slide showing protected Butterflies and others of different genera imitating them
- 49a "
- 52 Lappet Moth, just hatched, on empty cocoon
- 54 Trout Fishing
- 56 Newt coming to surface of water to breathe

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- 9 Bustards at sunrise
- 10 A drive
- 11 Grouse gliding up to the guns
- 12 A Merlin seizing her prey
- 13 Wildfowl on the mud flats
- 14 Snipe boring
- 15 On the outlying heath
- 16 The first drive of the season
- 17 The home of the Ptarmigan
- 18 Falcon on the watch
- 19 Woodcock dropping into cover
- 20 Spent (Fox)
- 21 Condemned to death (Stags)
- 22 Through the deep drift (Stags)
- 23 Mallards off the Coast
- 24 Guillemots and Puffins
- 25 Goldfinches [Coast]
- 26 Cormorants on the Wild West
- 27 Christmas Visitors (Field Pares)
- 28 Norwegian Hawk Owl
- 29 Black Game [Plumage]
- 30 Ptarmigan in Summer
- 31 The Poacher (two hards)
- 32 Condor of the Andes Eagle
- 33 Peregrine Falcon and Ptarmigan
- 34 The Moors, Blackcock [gun]
- 35 Partridges in Winter Months
- 36 Hen and Cock Pheasant on Nest
- 37 Hare and Pheasants at Rest
- 38 Wild Duck Shooting
- 39 Grouse-shooting: Flanking the Pack into the Guns
- 40 Pheasants in Close Time
- 41 Grey Hen and Nest [Plumage]
- 42 Partridges in Mid-September
- 43 Sparrow Hawk raiding a flock
- 44 Black Game [of Chaffinches]
- 45 Mallard going down wind
- 46 Parent Partridges and the last of their Brood; the Cock and Hen distinguished by Plumage
- 47 Greenland Falcon, Adult Plumage
- 48 Three Herons in Flight

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- 53 Fight between Fox and Stoat in Snow.
- 54 Peewits Alarmed by Part-ridges. A nest disturbed.
- 55 Havoc. Stoat raiding a part-ridge's Nest.
- 56 Peregrine Falcon Teaching its Young to Stoop.
- 57 The Tree-Warbler.
- 58 Wild Ducks Entering Decoy Pond at Daybreak.
- 59 Fox Hunting Hares.
- 60 The first glimpse of the beaters
- 61 The Pacific Eider Duck at Home.
- 62 The Humming-Bird.
- 63 Birds of Paradise, I.
- 64 " II.
- 65 "The Secretary Bird and Common Rock Snake of Natal.
- 66 Swans, whistling and mate.
- 67 Scoresby's Gull (June, 1905).
- 68 The Honey-Buzzard Riffing a Wasps' Nest of Larvæ.
- 69 Bird Snarers at Work.
- 70 Snaring Wild Fowl.
- 71 Extinct and Vanishing Birds.
- 72 Wing of Bird (Green Canary).
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- 84 The Great Marions Tortoise (*Testudo Sumeirei*) now living at Port Louis, Mauritius (March, 1903).
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- 86 Tortoise with Eggs in Garden.
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- 88 Common Toad.
- 89 The King Crab.
- 90 Oriental River Prawn. *Palamon Lar Fabricius*. From Spence Bate (Oct., 1899).
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- 103 Swan on Nest.
- 104 Thrush's Nest and Eggs.
- 105 Snipe on Nest.
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- 107 Slugs on a Cabbage Leaf.

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- 4 " The Pullers at Work on Cliff-top.
- 5 " Climber walking up the Face of Cliff.
- 6 " Climber nearing the Cliff-top.
- 7 " Climber at the Top.
- 8 " Climber emptying his Pouches.
- 9 " A Heap of 300 Eggs of Guillemots and Razorbills.
- 10 " Birds on the Cliff Ledges.
- 11 Carrion Crow.
- 12 Cuckoo (young) on Nest of Pied Wagtail.
- 13 Curlews, Two Young.
- 14 Turtle Doves, a Pair of Young.
- 15 Spotted Flycatcher beside Nest.
- 16 " Young Bird.
- 17 Young Red Grouse among Heather.
- 18 Black-headed Gulls. A pretty View of Island with Birds on Nest and on the Wing.
- 19 " General View of Gullery.
- 20 " Young just Hatched, showing another pecking its Way out of Egg.
- 21 " On Nest.
- 22 " Standing beside Nest.
- 23 Merlin Hawk on Nest.
- 24 Nightjar (young), 10 days' old.
- 25 " 3 weeks' old.
- 26 A White Jackdaw.
- 27 A Young Jay.
- 28 Jays (young) on Edge of Nest.
- 29 " Showing Crest.
- 30 Kingfisher at Home.
- 31 Knots, A Group of.
- 32 Lapwing.
- 33 " Nest and Eggs, with young one just Hatched.
- 34 " Nest of Young.
- 35 A Pair of Young Magpies.
- 36 Mallard (Wild Duck) on Nest.
- 37 " Nest Covered, as left by Bird.
- 38 " Nest Uncovered, showing Eggs.
- 39 King Owl on Nest.
- 40 Barn Owl, Nesting Tree.
- 41 " " Interior View, showing Eggs and Mice.
- 42 A Young Long-eared Owl.
- 43 " " Two in Nest.
- 44 " " On Twigs.
- 45 Tawny Owl on Nest in Rabbit Burrow.
- 46 Partridge on Nest.
- 47 Pheasant on Nest.
- 48 Tree Pipit on Nest.
- 49 " Beside Nest.
- 50 Robin on Greenhouse.
- 51 Sandpiper, Haunt of.
- 52 " On Nest.
- 53 " Nest and Eggs.
- 54 Skylark on Nest.
- 55 " Feeding Young.
- 56 " Young, on Nest.
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- 59 Starling about to feed Young.
- 60 Missel Thrush feeding Young.
- 61 Song Thrush at Home.
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- 65 Sedge Warbler feeding Young.
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- 68 Whitethroat feeding Young.
- 69 Woodcock on Nest.
- 70 Green Woodpecker, Nesting Site, showing Hole in Tree.
- 71 " Pair of Young.
- 72 " Family of Young.
- 73 Wren feeding Young.
- 74 A Baboon in a Fit of Temper.
- 75 The Badger.
- 76 A West Highlander (Bull).
- 77 Dogs, Foxhounds at the Kennels.
- 78 " " Out for Exercise.
- 79 " " A Meet of the Hounds.
- 80 " Young Lupetti Dogs.
- 81 " A Retriever (head study).
- 82 A Young Wild Fox leaving Fox-earth.
- 83 Horse (a head study).
- 84 Field Mouse Nest with Young.
- 85 Otters, A Pair of Young.
- 86 " Leaving Pond after a Bath.
- 87 Pigs, A Study in Black and White.
- 88 Rabbit (young) at the Entrance of Burrow.
- 89 Wildflowers *in situ*, Daisies in Field.
- 90 " Forget-me-nots in Whins.
- 91 " Primrose Root in Wood.
- 92 " Wood Anemone.
- 93 " Water Ranunculus.
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- 95 Young Sandpiper on Nest, just hatched.
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| 10 N. Ziczac. | 22 Ichneumon Fly. | 34 Lemon Sole in natural surroundings. |
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- 8 " " side view.
- 13 Noctule Bat (*Vesperugo noctula*) front view.
- 14 " " three-quarter view.
- 15 " " descending trunk.
- 16 " " pair of.
- 19 Common Bat (*Vesperugo pipistrellus*), front view.
- 20 " " showing teeth.
- 21 Common Bat, dorsal.
- 22 Natterer's Bat, front.
- 23 Natterer's Bat, side.
- 24 Natterer's Bat, drawing.
- 25 Greater Horseshoe Bat, front.
- 26 Greater Horseshoe Bat, side.
- 27 Greater Horseshoe Bat, suspended.
- 28 Lesser Horseshoe Bat, front.
- 29 Lesser Horseshoe Bat, side.
- 30 Lesser Horseshoe Bat, suspended.

ORDER INSECTIVORA.

- 31 Hedgehog (*Eriaceus Europæus*), side view.
- 32 " " front view.
- 33 " " dorsal view.
- 34 " " coiled.
- 35 " " attacking grass-snake.
- 36-41 Six Successive Stages of a Hedgehog uncoiling.
- 42 Two Young Hedgehogs in Nest.
- 43 An Old Hedgehog climbing.
- 44 Magnified section of pointed end of Hedgehog's Quill.
- 45 " " root end.
- 46 " " transverse section of Quill.
- 47 " " superficial view of Quill.
- 52 Mole (*Talpa Europæa*), side view.
- 53 " " with eyes clearly displayed.
- 54 " " devouring worm.
- 55 " " burrowing.
- 56 " " emerging.
- 60 Bones of the Mole's Fore-limb.
- 61 " " with Bones of Shrew-mouse for comparison.
- 62 Magnified vertical section through Mole's Mandible.
- 63 " " superficial view of Mole's Mandible.
- 64 " " grinding surface of worn Lower Molars.
- 65 " " ventral aspect of Upper Jaw.
- 66 Vertical section of simple Mole Fortress.
- 67 " " complicated Mole Fortress, four nests in situ.

- 69 Mole's Zig-zag Surface Run.
- 76 Common Shrew Mouse (*Sorex araneus*), side view.
- 77 " " running.
- 78 " " sitting up.
- 79 Duel between Common Shrew Mice, feinting for opening.
- 80 " " one combatant caught by tail.
- 81 " " close-locked spin.
- 82 " " breaking away.
- 83 Pygmy Shrew Mouse (*Sorex minutus*) front view.
- 84 " " dorsal view.
- 85 " " climbing.
- 86 " " hunting insect.
- 87 " " eating beetle.
- 88 " " asleep.
- 89 Water Shrew Mouse (*Crossopus fodiens*), foraging at edge of water.
- 90 " " about to dive.
- 94 Shrew Mouse Skin, with Hair parted to show Scent-glands.
- 95 Front view of Head of dead Shrew Mouse, showing vibrissæ.
- 96 Hibernating Glands of Shrew Mouse.
- 97 Magnified Skull of Common Shrew Mouse.
- 98 " " Mandible of "
- 99 " " Upper Jaws of "
- 100 Magnified vertical section through Mandible of Water Shrew Mouse.
- 101 Skulls and Fore-limb Bones of the Pygmy Shrew Mouse, an immature Common Shrew Mouse of the same size, and a mature Common Shrew Mouse.
- 102 Dead specimens of the Pygmy Shrew Mouse and an immature Common Shrew Mouse, showing the external specific differences.

ORDER CARNIVORA.

- 105 Badger (*Meles taxus*), side view.
- 106 " " emerging from burrow.
- 107 " " pair of.
- 108 Badger's Skull, side view.
- 109 " " dorsal view.
- 110 Marten (*Mustela martes*), side view.
- 111 " " standing.
- 112 " " sliding on bough.
- 113 " " with extended neck.
- 114 " " "
- 118 Polecat (*Putorius fortidus*), front view.
- 119 " " with extended neck.
- 120 " " asleep.
- 124 Stoat (*Putorius erminea*), front view, sitting up.
- 125 " " front view, crouching.
- 126 " " side view.
- 127 " " coiled.

NATURAL HISTORY SUBJECTS—Continued

- 131 Weasel (*Putorius vulgaris*) side view.
133 " listening.
133 " with extended neck.
134 " coiled.
135 Weasel Kittens.
136 Skulls of Stoat and Weasel, showing denti-
tion and articulation of Jaws.
137 Fox Cub, front.
138 " side.
139 Fox, front.
140 " side.
141 " crouched.
142 Badger, front.
143 " side.
144 Articulation of Badger's jaw.
145 Badger's Earth.
146 Otter, side.
147 " front.
148 Otters playing in water.
149 Otter swimming.
150 Wild Cat, front.
151 " " side.
152 " " startled.

ORDER RODENTIA.

- 170 Squirrel (*Sciurus vulgaris*), side view.
171 " front.
172 " standing.
173 " sitting up.
174 " listening.
177 Dormouse (*Muscardinus avellanarius*) front view.
178 " side view.
179 " three-quarter view.
180 " asleep.
181 Nest of Dormouse in furze Bush.
182 Nuts gnawed by Dormouse.
186 Harvest Mouse (*Mus minutus*), feeding.
187 " side view.
188 " front view.
189 " climbing.
190 Pair of Harvest Mice.
191 " showing use of Prehensile Tail.
193 Harvest Mouse's Nest.
196 Long-tailed Field Mouse (*Mus sylvaticus*), front view.
197 " side view.
198 " three-quarter view.
199 " under dandelion.
200 " crouching, with depressed ears.
201 " listening.
202 Magnified right Upper and Lower Molars of same.
206 Common Mouse (*Mus musculus*), front view.
207 " side view.
208 " standing.
209 " on trap.
210 " entering trap.
211 " in trap.
212 Duel between House Mice.
213 Cinnamon Variety of Common Mouse (Partial albino).
217 Red-backed Meadow Mouse (*Eutamias glareolus*), front view.

- 218 Red-backed Meadow Mouse (*Eutamias glareolus*), side view.
219 " three-quarter view.
220 " burrowing.
221 " cleaning tail.
222 Skulls of Red-backed Meadow Mouse, Common Meadow Mouse, and Long-tailed Field Mouse, showing specific differences.
224 Nest Material of Red-backed Meadow Mouse.
226 Magnified right Upper and Lower Molars of same.
229 Common Meadow Mouse (*Microtus agrestis*), front view.
230 " side view.
231 Common Meadow Mouse
232 Magnified right Upper and Lower Molars of same.
233 Albino Variety of same, front view.
234 " side view.
235 " feeding.
236 Orkney Meadow Mouse (*Microtus orcadensis*), front view.
237 " side view.
238 " sitting up.
239 Duel between pair of same.
240 Typical Surface-run of Meadow Mouse, laid on-n.
241 Opened Entrance of same.
250 Water Rat (*Microtus amphibius*), front view.
251 " side view.
252 " entering water.
253 " swimming river.
254 " feeding on reed.
255 Duel between Water Rats.
256 Skull of Water Rat.
257 Magnified Lower Molars of same
262 Common Brown Rat (*Mus decumanus*), front view.
263 " side view.
264 " three-quarter view.
265 " feeding.
266 " running.
267 " emerging from hole.
271 Alexandrine Brown Rat (*Mus alexandrinus*), front view.
272 " side view.
276 Old English Black Rat (*Mus rattus*), standing.
277 " listening.
278 " collecting nest-material.
282 Alexandrine Black Rat (*Mus rattus ater*), side view.
283 " sitting up.
284 " feeding.
285 Hare (*Lepus timidus*), in form.
287 Leveret (*Lepus timidus*), front view.
288 " side view.
289 Hare, front view.
290 " side view.
291 " three-quarters.
292 Upper Jaw of Leveret.
295 Wild Rabbit.
296 Rabbit appearing over Ridge.

AMPHIBIA and REPTILIA.

ORDER AMPHIBIA.

- 330 Grass Frog (*Rana temporaria*), side view.
331 " " front view.
332 Spawn of Grass Frog, early stage.
333 " " eggs commencing to hatch.
334 Magnified Spawns, tadpoles showing
branchiae.
335 Dorsal and lateral views of Tadpoles show-
ing branchiae.
336 Tadpoles feeding on Star-wort.
337 Various stages of Tadpoles, showing de-
velopment of Limbs.
338 " " "
339 Edible Frog (*Rana esculenta*), side" view.
340 " " gaping.
341 " " croaking, vocal sacs distended.
342 " " climbing.

- 340 Common Toad (*Bufo vulgaris*), side view.
341 " front view.
342 " floating in water.
343 Group of Three Common Toads.
344 Shoulder-girdles of Grass Frog and Common Toad.
347 Natterjack Toad (*Bufo calamita*), front view.
348 " side view.
349 " stretching himself.
350 Natterjack and Common Toad together.
354 Variable Toad (*Bufo viridis*), side view.
355 " front view.
358 Tree Frog (*Hyla arborea*), climbing.
363 Fire-bellied Toad (*Bombinator igneus*), side view.
363 " in defensive attitude.
364 Pair of same, one in defensive attitude.

NATURAL HISTORY SUBJECTS—Continued.

ORDER REPTILIA.

- 365 Pair of Fire-bellied Toads (*Bombinator igneus*). One feigning death.
 370 Salamander (*Salamandra maculosa*), front view.
 371 " " side view.
 373 " " dorsal view.
 373 Pair of same, side view.
 374 " " dorsal view.
 400 Smooth Newt (*Triton vulgaris*), male.
 401 " " female.
 403 Group of Male and Female Smooth Newts.
 403 Male Smooth Newt, showing reproduction of tail.
 404 Courtship of two Smooth Newts.
 405-410 Six stages in the development of Newt Tadpoles from the egg.
 411 Tadpoles of Smooth Newt and Great Warty Newt, front view.
 413 " " side view.
 413 Smooth Newt's discarded Skin suspended in water.
 416 Great Warty Newt (*Triton cristatus*), male.
 417 " " female.
 418 " " male and female.
 421 Palmated Newt (*Triton palmatus*), male.
 421 " " female.
 425 Pair of Alpine Newts (*Triton alpestris*).
 449 Slow-worm (*Anguis fragilis*), full stretch.
 451 " " coiled.
 459 Two young Slow-worms.

- 465 Common Lizard (*Lacerta vivipara*), male.
 468 " " female.
 469 Sand Lizard (*Lacerta agilis*), male.
 470 " " female.
 474 Green Lizard (*Lacerta viridis*), male.
 476 Wall Lizard (*Lacerta muralis*), side.
 477 " " showing fight.
 490 Chameleon (*Chamaeleon vulgaris*), front view.
 491 " " side view.
 495 Grass Snake (*Tropidonotus natrix*), full length.
 496 Grass Snake, head reared.
 497 " " coiled.
 498 Eggs of Grass Snake.
 503 Smooth Snake (*Coronella austriaca*), full length.
 503 " " coiled.
 504 " " sloughing, eye-scale opaque.
 505 " " dorsal view.
 509 Adder (*Pelias berus*), striking.
 510 " " front view of head.
 511 " " coiled.
 512 Adder raising head.
 513 Small Red Adder striking.
 514 " " dorsal view of head.
 516 Dissection of Adder's Head, showing poison glands.
 517 Adder's Skull, fangs depressed.
 518 " " fangs erected.
 519 Adder's Fang, side view.
 520 " " front view.

PISCES (FISH).

- 540 Young Perch (*Perca fluviatilis*).
 541 Bullhead (*Cottus gobio*).
 542 Eel (*Anguilla vulgaris*), leaving water.
 543 Gudgeon (*Gobio fluviatilis*).
 545 Loach (*Nemachilus barbatulus*).
 547 Sticklebacks (*Gasterosteus aculeatus*).

- 548 Stickleback and Nest.
 549 Paradise Fish (*Polycanthus viridi-auratus*).
 560 Lamprey (*Petromyzon fluviatilis*).
 561 " " ventral surface.

For set of "Fish Life," see page 181.

INSECTA (INSECTS).

ORDER LEPIDOPTERA.

a, signifies wings spread; b, wings half-spread; c, wings closed; m, protective or aggressive mimicry.

- 570 Swallow-tail (*Papilio Macbaon*). a
 571 " " " b
 573 " " " c
 575 Large White (*P. Grassicae*). e
 577 Green Veined White (*P. Napi*). b
 578 " " " c
 580 Orange Tip (*E. cardamines*). a
 581 " " " b
 583 " " " c
 583 " " " m
 586 Pale Clouded Yellow (*C. Hyale*). c
 588 Brimstone (*G. Rhamni*). e
 589 " " " on bolly. m
 592 Small Pearl-bordered Fritillary (*A. se-lene*). a
 593 " " " c
 594 Silver Washed Fritillary (*A. paphia*). a
 595 " " " b
 596 " " " c
 597 " " " m
 606 Comma (*V. e-album*). a
 607 " " " c
 609 Large Tortoiseshell (*V. polychloros*). a
 610 " " " b
 611 " " " c
 613 Small Tortoiseshell (*V. urticae*). a
 616 Peacock (*V. io*). a
 617 " " " c
 619 Camberwell Beauty (*V. antiopa*). a
 620 " " " c
 623 Red Admiral (*V. atalanta*). a
 624 " " " b
 626 Painted Lady (*V. cardui*). a
 627 " " " c
 629 White Admiral (*L. sibylla*). a
 630 " " " c
 631 Chrysalis of same. "

- 633 Purple Emperor (*A. iris*). a
 634 " " " b
 635 " " " c
 636 Egg of same.
 637 Larva of same. m
 638 Pupa of same. m
 639 Pair of Purple Emperors. a, e
 642 Marbled White (*M. Galatæa*). a
 650 Grayling (*S. semele*). c
 653 Ringlet (*E. byperanthus*). c
 658 White-letter Hair Streak (*T. w-album*). c
 659 Pair of same. m
 663 Green Hair Streak (*T. rubi*). e
 669 Common Blue (*L. icarus*). a
 670 " " " e
 672 Chalk Hill Blue (*L. eorydon*). a
 674 Holly Blue (*L. argiolus*). c
 678 Duke of Burgundy (*N. lucina*). a
 679 " " " c
 681 Grizzled Skipper (*S. malvae*). a
 683 " " " c
 684 Small Skipper (*H. thaumas*). a
 690 Death's Head Hawk Larva (*S. atropos*).
 691 " " " m
 693 Privet Hawk Larva (*S. iligstri*). m
 696 Large Elephant Hawk Larva (*S. elpenor*), early stage.
 697 " " full fed.
 698 " " full fed. m
 702 Humming Bird Hawk Motb (*M. stellatarum*).
 703 Broad Bordered Bee Hawk.
 704 Pair of same.
 705 Hornet Clearwing (*T. apiformis*), dorsal view. m.
 706 " " side view. m
 707 " " front view. m
 708 " " three-quarter view. m
 709 Hornet Clearwing. *Bembeciformia*. Front, m.
 710 " " " Side, m.
 711 " " " " m.

NATURAL HISTORY SUBJECTS—Continued.

- 712 Clearwing, *Culiciformis*. Dorsal. m.
 713 " " Side. m.
 714 " " Front. m.
 715 Larva of Cinnabar Moth (*E. Jacobææ*). m.
 718 Cream Spot Tiger (*A. villica*).
 720 White Ermine (*S. Mentastri*), dorsal view.
 721 " front view.
 723 Larva of Gold-tail Moth (*Auriflua*), dorsal view.
 724 " side view.
 727 Lappet Moth (*L. quercifolia*).
 740 Larva of Emperor Moth (*S. pavonia*).
 741 Cocoon of same.
 742 Female Emperor Moth.
 747 Scalloped Hook-tip, dorsal view.
 748 " front view.
 749 " side view.
 750 Larva of Puss Moth (*D. vinula*). m.
 751 " whips extended. m.
 753 Cocoon of same. m.
 753 Puss Moth, front.
 754 " side.
 756 Buff Tip (*P. bucephala*), dorsal view. m.
 757 " side view. m.
 770 Mother Shipton (*E. mi*), dorsal view.
 774 Swallow Tail Moth (*U. sambucaria*), dorsal view.
 775 " side view.
 776 Large Emerald (*G. papilionaria*), dorsal view.
 777 " side view.
 778 Pepper Moth. (*Melanism*). b.
 779 " Side.
 780 Common Ware (*C. exantemaria*).
 781 " impaled on thorn by wind.
 784 Currant Moth (*A. grossulariata*).
 787 Beautiful Carpet (*N. albicollata*).
 788 Treble Bar Moth (*A. plagiata*).
 790 White Plume Moth (*A. pentadactyla*), dorsal view.
 791 " side view.
 792 Pair of Plume Moths.
 793 Vapourer Moths, male and female.
 794 Psyche in case. m.
 796 Long-horn Moth (*Adela*).
 798 Larva of Lobster Moth (*S. fagi*). m.
 799 " feeding.
 800 Pair of same.
 802 Larvae of Purple Thorn (*Trimaculata*). m.
 804 Pupa of Brimstone and Peacock Butterflies.
 805 Pupa of Swallow-tail, Silver-washed Fritillary and large Tortoiseshell Butterflies.
 806 Small Black and White Moth, mimicry of excrement.
- ORTHOPTERA.
- 810 British Cockroach. (*E. lapponica*). Side.
 811 " " Dorsal.
 815 Common Cockroach (*B. orientalis*), side view.
 816 " on mouse-trap.
 817 Common Grasshopper (*Stenobothrus*).
 818 Pair of same.
 829 *Tettix bipunctatus*.
 826 Green Sabre-tailed Grasshopper (*L. punctatissima*), female.
 829 Tree Grasshopper (*M. varium*), female.
 831 *L. punctatissima* and *M. varium* together.
 834-7 Four stages of the Brown Sabre-tailed Grasshopper (*T. cinereus*).
 838 Pair of Male *T. cinereus*.
 840 Great Green Grasshopper (*L. viridissima*), female.
 841 " dorsal view.
 842 " legs raised.
 843 *Platyceles grisea*. Male and female.
 844 " Three-quarter.
 850 Field Cricket (*Gryllus campestris*), side view.
 851 " front view.
 852 " backing out of hole.
 853 " stridulating at entrance of hole.
 854 Pair of same.
 855 Immature Female of same (no ovipositor).

- 856 Stridulating organ. Field Cricket.
 860 Mole Cricket (*Gryllotalpa gryllotalpa*), side view.
 861 " three-quarter view.
 865 House Cricket (*Gryllus domesticus*), side view.
 866 " dorsal view.
 867 Larval House Cricket.
 868 Wood Cricket (*N. sylvestris*). Side.
 869 " " " Dorsal.

HYMENOPTERA.

- 880 Giant Wood-wasp (*S. gigas*) dorsal view.
 881 " side view.
 883 " ventral view.
 885 Larvae of Sawfly.
 887 Ichneumon Fly (*Proteus*).
 888 Ichneumon Fly (*Ophion*).
 892 Common Wasp (*Vespa vulgaris*), side view.
 893 " front view.
 894 Queen of same hibernating.
 895 Entrance of Wasp Nest.
 896 *Crabro interruptus*.
 897 Store of same. Bluebottles.
 898 Sand-wasp (*O. spinipes*), see also Life History of Mud Wasp.
 899 Sand-wasp (*Ammophila sabulosa*).
 901 Sand-wasp (*Boops*), front view.
 902 " side view.
 903 " dorsal view.
 904 Sand-wasp (*Flavipes*), side view.
 905 " dorsal view.
 907 Rubytail (*Chrysis ignita*).
 912 Dipterous Fly devouring small Sand-wasp.
 914 Cuckoo of the Leaf-cutter Bee (*Celioxys*).
 916 Burrowing Bee (*Anthophora plilipes*), dorsal view.
 917 " side view.
 918 Cuckoo of same (*Melecta armata*), dorsal view.
 921 Long-Horned Bee. Dorsal.
 922 " Side.
 923 Sawfly. Side.
 924 Larvae of Sawfly.
 925 Sawfly. T. mesomela.
 924 Humble Bee (*Bombus terrestris*), on daffodil.
 925 " on hyacinth.
 926 Solitary Wasp (*Crabro cibaricus*).

NEUROPTERA, DIPTERA, AND TRICHOPTERA.

- 940 Dragon Fly (*L. depressum*).
 941 " Larvae (*L. depressum*).
 942 " (*Cordulegaster*).
 944 " (*Calopteryx*).
 946 " (*Agria*).
 948 Lacewing Fly (*Chrysops*), dorsal view.
 949 " side view.
 950 Stalked Eggs of same.
 952 Crane Fly (*Tipula*), on bramble.
 953 Bee Fly (*Bombylius*), on thyme. m.
 954 " on scabious. m.
 956 Wasp Fly (*Volucella*).
 957 Hover Fly (*Syrphus*).
 959 Caddis Worm, with casing of star-wort leaves. m.
 960 Caddis Fly (*Phryganea grandis*).
 961 Drone Fly (*Eristalis*), on Golden Rod.
 962 Scorpion Fly. Male.
 963 " Female.
 965 Robber Fly. *Asilus*.
 966 Gnat. *Culex*. Magnified.
 967 Daddy Long Legs.
 968 *Bombylius major*.
 969 *Bombylius minor*.
 970 Mayfly.

COLEOPTERA.

- 980 Tiger Beetle (*Cicindela*), dorsal view.
 981 " side view.
 986 Great Water Beetle (*H. piceus*), male.
 987 " female.
 988 " female and larva.

BRITISH BIRDS AND NESTS—Continued.

- 62 Spotted Flycatcher.
 63 Bar-tailed Godwit wading. *Limosa lapponica*. (Lincolnshire.)
 65 Black-tailed Godwit Nest. *Limosa lapponica*. (Texel.)
 66 Goldfinch on thistle. *Carduelis elegans*.
 67 " Nest and eggs.
 70 Goshawk killing rabbit (Trained bird.)
 71 " Nest.
 72 Nest of Black-necked Grebe, Hungary. *Podiceps nigricollis*.
 73 Great Crested Grebe. Nest with two eggs.
 74 " Eggs covered up.
 75 Little Grebe on Nest. *Podiceps minor*.
 77 " Nest.
 79 Nest of Greenback with eggs. *Ligustrum chloris*.
 80 Guillemots.
 82 Black-headed Gull. *Larus ridibundus*.
 83 " " in winter plumage.
 85 " " Nest, with three eggs.
 86 " " on Nest.
 87 " " in London.
 88 Lesser Black-backed Gull standing on rock. *Larus fuscus*.
 89 " " " Nest with two eggs.
 90 " " " Two young birds in down.
 91 Herring Gull swimming. *Larus argentatus*.
 92 Marsh Harrier. Nest. *Circus arcticus*.
 93 Montague's Harrier, Nest and eggs. *Circus cineraceus*. (Norfolk.)
 94 Nest of Hawfinch in hawthorn, with four eggs. *Coccothraustes vulgaris*.
 96 Foot of Sparrow Hawk.
 97 Heron standing on stone. *Ardea cinerea*.
 98 " on tree above nest, Richmond Park.
 99 Buff-backed Heron on branch of tree. *Ardea bubulcus*. (Spain.)
 101 " " Nest with five eggs.
 102 Night Heron. *Nycticorax nycticorax*.
 103 " " Nest with two eggs. (Spain.)
 104 Purple Heron's Nest and three eggs. *Ardea purpurea*. (Spain.)
 105 " " " and four eggs. (Holland.)
 106 " " " and young. (Holland.)
 107 " " " stepping on nest. (Automatically photographed by electricity.)
 108 Squacco Heron. *Ardea ralloides*. (Spain.)
 109 " " Nest, with three eggs.
 110 Great White Heron and Young in Nest, Albania. *Ardea alba*.
 113 Wading to photograph Herons, Egrets, and Ibis in Andalusia.
 114 Hobby.
 115 Glossy Ibis. *Plegadis falcinellus*.
 116 " " with Herons. (Spain.)
 117 " " Nest and two eggs.
 118 Two Jackdaws, Albania. *Corvus monedula*.
 119 Jackdaw's Nest.
 120 Kestrel's Nest and eggs. *Falco tinnunculus*.
 121 Kingfisher. *Alcedo isipda*.
 122 " site of nest.
 123 " young bird.
 125 Black Kite's Nest, with three eggs. *Milvus migrans*. (Spain.)
 126 " Egg.
 129 Kittiwake on Nest, with egg, showing young bird. *Rissa tridactyla*.
 131 " Pair on Nest, with two young birds.
 133 " Site of Nest with birds, Farne Islands.
 (Medal of the Royal Photographic Society of Great Britain for these photographs.)
 133 Lapwing. Cock.
 135 Sky Lark's Nest and eggs. *Alda arvensis*.
 136 " Young.
 138 House Martin. Nest.
 140 " " Five Nests.
 141 " " Two Martins.
 142 Sand Martin's Nest Holes.
 143 Moorhen. *Gallinula chloropus*.
 144 " sitting.
 145 " Nest and eggs.
 147 Nightingale Nest, with four eggs. *Daulias fuscinia*.
 148 " on Nest.
 149 " taking meal-worm.
 150 Nightjar on Nest. *Caprimulgus europaeus*.
 151 " Nest and eggs.
 152 " Two young birds.
 153 " on bough.
 154 " and young.
 155 " sitting.
 156 Barn Owl. *Stryx flammea*.
 157 " Young bird in down.
 158 Long-eared Owl. Young bird. *Asio otus*.
 159 " Adult.
 160 Short-eared Owl. *Asio accipitrinus*.
 161 " Ear of.
 162 " Nest and eggs. (Norfolk.)
 163 Tawny Owl. *Syrnium aluco*.
 164 Oyster Catcher. *Hamatopus ostralegus*.
 165 " Nest.
 166 " Nest and eggs.
 167 Partridge's Nest, with thirteen eggs. *Perdix cinerea*.
 168 " on Nest.
 169 Dalmatian Pelicans on Nests, Albania. *Pelecanus crispus*.
 170 " " " "
 171 Peregrine. *Falco peregrinus*.
 172a " on perch
 173 " killing partridge. (Trained bird.)
 174 Pheasant. Cock basking. *Phasianus colchicus*.
 175 " Nest, with twelve eggs.
 176 " Hen-bird sitting.
 177 Wood Pigeon's Nest and two eggs.
 178 Pintail's Nest.
 180 Green Plover. *Vanellus cristatus*.
 181 " " Nest, with four eggs.
 182 " " sitting.
 183 " Young bird.
 184 Pair of Grey Plovers in summer plumage. *Squatarola helvetica*.
 185 Kentish Plover's Nest, with three eggs. *Egialitis cantiana*.
 187 Ringed Plover. *Egialitis hiaticula*.
 188 " Nest with four eggs.
 189 " Nest and eggs.
 193 Puffins. Two birds. *Fratercula arctica*.
 195 " Young bird at mouth of nest-hole.
 196 " Burrow, with egg and bird's head.
 197 Nest of Water Rail, Hungary. *Rallus*
 198 Raven. *Corvus corax* (Transylvania.)
 199 " Nest and eggs. *Corvus corax*. (Spain.)
 200 Redbreast. *Erythacus rubecula*.
 201 " Nest, with three eggs.
 202 Lesser Redpole. *Acanthis rufescens*.
 203 " Nest.
 204 Redshank's Nest with four eggs. *Totanus calidris*.
 205 Redstart. *Ruticilla phaniscus*.
 206 " Nest, six eggs in hole of sycamore tree.
 207 Rook. *Corvus frugilegus*.
 208 " Nest and eggs.
 209 Climbing to Rook's Nest.
 210 Ruff.
 211 Nest of Common Sandpiper.
 212 Grey Shrike on Shrub. *Lanius meridionalis*. (Spain.)
 213 Nest of Red-backed Shrike. *Lanius col-lurio*.
 214 Hedge Sparrow on Nest. *Accentor modularis*.
 215 " " Nest and eggs.

BRITISH BIRDS AND NEST—Continued.

- 218 Spoonbill's Nest and six eggs. *Platylea leucorodca*. (Holland.)
 219 " Young bird in nest.
 220 " and three young in nest.
 221 " and two young in nest.
 222 Starling outside Nest in old Wood-pecker's Hole. *Sturnus vulgaris*.
 223 " Nest and eggs.
 225 " looking out of hole.
 228 Stilt Nest, with four eggs. *Himantopus candidus* (Spain.)
 229 " Egg.
 230 White Stork on Ground. *Ciconia alba*.
 231 " with young in Nest.
 232 " Bird on Nest, with two young. (Holland.)
 234 Swallow's Nest and four eggs. *Hirundo rustica*.
 235 " on Nest.
 238 " Young.
 239 Teal.
 240 " Nest.
 242 Black Tern's Nest, with three eggs. *Hydrochelidon nigra*. (Spain.)
 243 " " on Nest.
 244 " " Two young birds in Nest.
 245 " Egg.
 246 White-winged Black Tern on Nest, Hungary. *H. leucoptera*.
 247 White-winged Black Tern, Nest.
 248 Common Tern's Nest, with two eggs. *Sterna hirundo*. (Holland.)
 249 " " on Nest.
 250 Lesser Tern's Nest, with egg and young bird. *Sterna minuta*. (Texel.)
 251 " Two eggs.
 252 Sandwich Tern's Nest. *Sterna cantianca*.
 253 " " among Bladder Campion. Egg and freshly-hatched bird and empty egg shell. (Farne Islands.) (Spain.)
 255 " " Egg. (Spain.)
 256 Mistle Thrush on Nest. *Turdus viscivorus*.
 257 " Nest.
 259 Song Thrush Nest. *Turdus musicus*.
 260 " Nest and young.
 261 Bearded Tit. Nest.
 262 " feeding young.
 263 Blue Tit. *Parus caeruleus*.
 264 " Stump showing hole in which nest was lodged.
 265 Nest of Long-tailed Tit. *Acredula rosea*.
 266 Nest of Marsh Tit (hole cut out to show nest).
 267 Griffon Vulture. *Gyps fulvus*. (Transylvania.)
 268 " "
 270 " " Young Bird in Nest.
 271 Pied Wagtail. *Motacilla lugubris*.
 272 " "
 273 " " Nest.
 274 " " Nest with young.
 275 Yellow Wagtail. *Motacilla raii*.
 277 " Nest and eggs.
 278 Garden Warbler on Nest. *Sylvia hortensis*.
 279 " Nest.
 280 Reed Warbler's Nest. *Acrocephalus streperus*.
 282 " Nest and young.
 284 Great Reed Warbler Nest. *Acrocephalus turdoides*. (Holland.)
 285 " Young.
 286 Nest of Savi's Warbler. *Loenstella luscinoides*. (Holland.)
 287 Sedge Warbler feeding young. *Acrocephalus phragmitis*.
 288 " Nest.
 289 Water Hen in Reeds.
 290 " Feeding.
 291 Whinchat, Cock. *Pratincola rubetra*.
 292 " with beetle.
 294 Greater Whitethroat. *Sylvia cinerea*.
 295 " "
 296 " " Nest, with eggs.
 297 Lesser Whitethroat, young. *Sylvia curruca*.
 300 Wren Nest. *Troglodytes parvulus*.
 301 Willow Wren. *Phylloscopus trochilus*.
 302 " "
 303 " " Nest, with five eggs.

CD

BIRD NOTES.

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 2 Starling.
 3 Goldcrest.
 4 Robin watching Heron.
 5 Tom-Tit.
 6 Bullfinch.
 7 Green Woodpeckers.
 8 Rook and Blackbird.

- 9 Thrush breaking Snails.
 10 Cole Tits.
 11 Nuthatches.
 12 Swallows.
 13 Chiffchaff Feeding Young Cuckoo
 14 Pied Woodpeckers.
 15 Group of Birds—Winter-time.

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- " " 17 "
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CH THE COMMONER BIRDS OF OUR GARDEN— THEIR HABITS AND FOOD

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- | | |
|----------------------|-----------------------------------------|
| 1 The House Sparrow. | 23 The Greater Whitethroat. |
| 2 " Starling. | 24 " Redstart. |
| 3 " Robin. | 25 " Jackdaw. |
| 4 " Blackbird. | 26 " Spotted Flycatcher. |
| 5 " Chaffinch. | 27 " Wren. |
| 6 " Greenfinch. | 28 " Cuckoo. |
| 7 " Rook. | 29 " Turtle Dove. |
| 8 " Song-Thrush. | 30 " Hawfinch. |
| 9 " Skylark. | 31 " Jay. |
| 10 " House Martin. | 32 " Blackcap. |
| 11 " Swallow. | 33 " Butcher Bird or Red-backed Shrike. |
| 12 " Hedge Sparrow. | 34 " Brown-headed Sea Gull. |
| 13 " Pied Wagtail. | 35 " Tree-Creeper. |
| 14 " Wood Pigeon. | 36 " Nuthatch. |
| 15 " Plover. | 37 " Green Woodpecker. |
| 16 " Blue Tit. | 38 " Wryneck. |
| 17 " Brown Linnet. | 39 " Magpie. |
| 18 " Great Tit. | 40 " Barn Owl. |
| 19 " Yellow Hammer. | 41 " Kestrel Hawk. |
| 20 " Bullfinch. | 42 " Nightjar. |
| 21 " Swift. | 43 " Goldfinch. |
| 22 " Missel-Thrush. | 44 " Nightingale. |

CG ENGLISH BIRDS

The slides in this set are photographed from the exquisitely mounted specimens in the Natural History Museum, South Kensington, showing the birds, their nests and surroundings as far as possible in a state of nature. Many of them show the eggs or young birds.

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NOTES FOR LECTURING, 9d.

- | | |
|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| 1 Bearded Tit and Nest. <i>Panurus biarmicus</i> . | 20 Missel Thrush. <i>Turdus viscivorus</i> |
| 2 Blue Tit on stump of Tree. <i>Parus Coeruleus</i> . | 30 Song Thrush and Nest. <i>Turdus musicus</i> |
| 3 Marsh Tit with young in hollow of Tree. <i>Parus palustris</i> . | 31 Meadow Pipit, or Titlark, feeding Young. <i>Anthus pratensis</i> |
| 4 Great Titmouse feeding Young. <i>Parus major</i> . | 32 Tree Pipit, Nest and Eggs. <i>Anthus aboreus</i> |
| 5 Great Titmouse with Nests made in a letterbox. 1899, 1890, 1896. <i>Parus major</i> . | 33 Tree Pipit feeding Young. |
| 6 Longtailed Titmouse with young birds on bush. <i>Parus caudatus</i> | 34 Skylark feeding Young. <i>Alauda arvensis</i> |
| 7 Great Spotted Woodpecker. <i>Picus major</i> | 35 Skylark rising from the ground. <i>Alauda arvensis</i> |
| 8 Carrion Crow with Nest and Eggs. <i>Corvus corone</i> | 36 Common Flycatcher and Nest. <i>Muscicapa grisola</i> |
| 9 Hooded Grey or Royston Crow feeding Young. <i>Corvus cornix</i> . | 37 Pied Flycatcher on Tree feeding Young. <i>Muscicapa atricapilla</i> |
| 10 Jackdaw in hollow of Tree. <i>Corvus monedula</i> | 38 Kingfishers on Bank. <i>Halcyon amyraena</i> |
| 11 Jay and Nest, Jays feeding Young. <i>Garrulus glandarius</i> | 39 Pied Wagtail feeding Young. <i>Motacilla lugubris</i> |
| 12 Magpie with Nest and Eggs. <i>Pica caudata</i> | 40 Common Crossbills on Fir Tree. <i>Loxia curvirostra</i> |
| 13 Rook feeding Young. <i>Corvus frugilegus</i> | 41 Lesser Redpole. <i>Linota rufescens</i> |
| 14 Starling and Young in hollow of a tree. <i>Sternus vulgaris</i> | 42 Nightingale, Nest, and Young. <i>Phylomela fuscinia</i> |
| 15 Bullfinch and Nest. <i>Pyrrhula europaea</i> | 43 Red-backed Shrike, or Butcherbird, feeding Young. <i>Lanius collurio</i> |
| 16 Chaffinch and Young. <i>Fringilla caelebs</i> | 44 Robin calling its mate. <i>Erithacus rubecula</i> |
| 17 Greenfinch, Nest and Eggs. <i>Fringilla chloris</i> | 45 Siskin and Nest. <i>Cryptometris spinus</i> |
| 18 Hawfinch and Nest. <i>Coccothraustes vulgaris</i> | 46 Whitethroat and Nest. <i>Sylvia cinerea</i> |
| 19 Linnets with Nest and Eggs, and Greenfinch. <i>Linota cannabina</i> | 47 Wood Wren on ground feeding Young. <i>Phylloscopus sibilatrix</i> |
| 20 Twite and Nest. <i>Fringilla flavirostris</i> | 48 Blackbird watching mate on Nest. <i>Merula merula</i> |
| 21 Common Bunting and Nest. <i>Emberiza hortulana</i> | 49 Blackcap feeding Young in Nest. <i>Sylvia atricapilla</i> |
| 22 Reed Bunting and Nest. <i>Emberiza hortulana</i> | 50 Stonechat and Eggs. <i>Pratincola rubicola</i> |
| 23 Snow Bunting on a Rock. <i>Plectrophenax nivalis</i> | 51 Winchat and Nests. <i>Pratincola rubetra</i> |
| 24 Yellowhammer. <i>Emberiza citrinella</i> | 52 Nuthatch with Young. <i>Sitta caesia</i> |
| 25 Reed Warbler feeding Young. <i>Acrocephalus streperus</i> | 53 Wheatear feeding Young. <i>Saxicola oenanthe</i> |
| 26 Willow Warbler and Nest. <i>Phylloscopus trochilus</i> | 54 Young Cuckoo in Nest being fed by two Hedge-sparrows. <i>Cuculus canorus</i> |
| 27 Garden Warbler. <i>Sylvia hortensis</i> | 55 Long-eared Owl feeding Young with Mice. <i>Asioot</i> |
| 28 Chiffchaff, Nest, and Eggs. <i>Phylloscopus rufus</i> | 56 Reed Warbler's Nest and Eggs |
| | 57 Golden Plover |
| | 58 Group of Herons on nest |

CC

BRITISH BIRDS.

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- 3 Ring-Ouzel. *Turdus torquatus*
- 4 Wheatear. *Saxicola cinerea*
- 5 Stonechat. *Pratincola rubicola*
- 6 Redstart. *Ruticilla phoeniceus*
- 7 Redthroat. *Eriophanes rubecula*
- 8 Nightingale. *Luscinia luscinia*
- 9 Whitethroat. *Sylvia cinerea*
- 10 Blackcap. *Sylvia atricapilla*
- 11 Dartford Warbler. *Melospheus undatus*
- 12 Sedge-Warbler. *Acrocephalus phragmitis*
- 13 Dipper. *Cinclus aquaticus*
- 14 Long-tailed Tit. *Acredula rosea*
- 15 Great Tit. *Parus major*
- 16 Crested Tit. *Parus cristatus*
- 17 Nuthatch. *Sitta caesia*
- 18 Wren. *Troglodytes parvulus*
- 19 Pied Wagtail. *Motacilla lugubris*
- 20 Grey Wagtail. *Motacilla cinerea*
- 21 Meadow Pipit. *Anthus pratensis*
- 22 Tree Pipit. *Anthus trivialis*
- 23 Rock Pipit. *Anthus obscurus*
- 24 Red-backed Shrike. *Lanius collurio*
- 25 Spotted Fly-catcher. *Muscicapa grisola*
- 26 Swallow. *Hirundo rustica*
- 27 Martin. *Chelidon urtica*
- 28 Tree-Creeper. *Certhia familiaris*
- 29 Hawfinch. *Coccothraustes vulgaris*
- 30 Lesser Red-poll. *Linota rufescens*
- 31 Bullfinch. *Pyrrhula europaea*
- 32 Crossbill. *Loxia curvirostris*
- 33 Yellowhammer. *Emberiza citrinella*
- 34 Cirl Bunting. *Emberiza cirlus*
- 35 Reed Bunting. *Emberiza schoeniclus*
- 36 Chough. *Pyrrhocorax graculus*
- 37 Magpie. *Pica pica*
- 38 Rook. *Corvus frugilegus*. Jackdaw. *Corvus monedula*. Starlings. *Sturnus vulgaris*
- 39 Raven. *Corvus corax*
- 40 Skylark. *Alauda arvensis*
- 41 Nightjar. *Caprimulgus europaeus*
- 42 Spotted Woodpecker. *Dendrocopos major*
- 43 Green Woodpecker. *Cecropia viridis*
- 44 Wryneck. *Tyr. torquilla*
- 45 Kingfisher. *Alcedo lapida*
- 46 Hoopoe. *Upupa epops*
- 47 Cuckoo. *Cuculus canorus*
- 48 Barn-Owl. *Bubo flammula*
- 49 Long-eared Owl. *Asio otus*. Chaffinch. *Fringilla caesia*. Great Blue and Coal Tits. *Parus caeruleus* and *Parus britannicus*. Goldcrest. *Regulus cristatus*
- 50 Montagu's Harrier. *Circus cineraceus*
- 51 Buzzard. *Buteo vulgaris*
- 52 Kite. *Milvus forficatus*
- 53 Peregrine. *Falco peregrinus*
- 54 Merlin. *Falco aesalon*
- 55 Kestrel. *Falco tinnunculus*
- 56 Honey-Buzzard. *Pernis apivorus*
- 57 Cormorant. *Phalacrocorax carbo*
- 58 Gannet. *Sula bassana*. Guillemot. *Sula leucogaster*
- 59 Grey-Lag Goose. *Anser cinereus*
- 60 Brent Goose. *Bernicla brenta*
- 61 Barnacle Goose. *Bernicla leucopsis*
- 62 Sheldrake. *Tadorna cornuta*
- 63 Widgeon. *Mareca penelope*
- 64 Pintail. *Dafila acuta*
- 65 Mallard. *Anas boschas*. Peregrine Falcon. *Falco peregrinus*. Heron. *Ardea cinerea*. Coot. *Fulica atra*
- 66 Gadwall. *Anas strepera*
- 67 Garganey. *Querquedula ciria*
- 68 Tufted Duck. *Fulvia cristata*
- 69 Elder Duck. *Somateria mollissima*
- 70 Common Scoter. *Edemia nigra*
- 71 Goosander. *Mergus americanus*
- 72 Red-breasted Merganser. *Mergus serrator*
- 73 Rock Dove. *Columba livia*
- 74 Turtle Dove. *Turtur communis*
- 75 Jay. *Garrulus glandarius*. Wood-Pigeons. *Columba palumbus*. Pheasants. *Phasianus colchicus*
- 76 Red-legged Partridge. *Caccabis rufa*
- 77 Partridge. *Perdix cinerea*
- 78 Quail. *Coturnix communis*
- 79 Blackcock. *Tetrao tetrix*
- 80 Capercaillie. *Tetrao urogallus*
- 81 Landrail. *Circus pratensis*
- 82 Stone Curlew. *Edimemus scolopax*
- 83 Golden Plover. *Charadrius pinnatus*
- 84 Lapwing. *Vanellus vulgaris*
- 85 Turnstone. *Streptopus interpres*
- 86 Grey Phalarope. *Phalaropus fulicarius*
- 87 Woodcock. *Scolopax rusticola*
- 88 Dunlin. *Tringa alpina*
- 89 Knot. *Tringa canutus*
- 90 Ruff and Reeve. *Machetes pugnax*
- 91 Sanderling. *Calidris arenaria*
- 92 Greenshank. *Totanus caenicus*
- 93 Oyster-catchers. *Haematopus ostralegus*. Ringed Plover. *Spizella monticola*. Little Stint. *Tringa minuta*. Curlew. *Numenius aquata*
- 94 Common Tern. *Sterna fuscata*
- 95 Lesser Tern. *Sterna minuta*
- 96 Black Tern. *Hydrochelidon nigra*
- 97 Great Black-backed Gull. *Larus marinus*
- 98 Black-headed Gull. *Larus ridibundus*. Poo-ha. *Fuligula ferina*. Shoveler. *Spatula clypeata*. Water Hens. *Gallinula chloropus*
- 99 Great Skua. *Stercorarius catarrhactes*
- 100 Stormy Petrel. *Procellaria pelagica*
- 101 Manx Shearwater. *Puffinus anglicorum*
- 102 Fulmar. *Fulmarus glacialis*
- 103 Great Northern Diver. *Colymbus glacialis*
- 104 Great Crested Grebe. *Podiceps cristatus*
- 105 Little Grebe. *Tachybaptus flavirostris*
- 106 Razorbill (winter plumage). *Alca torda*
- 107 Little Auk. *Margulus alle*
- 108 Puffin. *Fratercula arctica*
- 109 Bittern.
- 110 Bearded Tit.
- 111 Dotterel.
- 112 Golden Eagle.
- 113 Goldfinch.
- 114 Ptarmigan. Winter and Autumn Plumage.
- 115 Roseate Tern. Adult and Immature.
- 116 Teal. Male and Female.



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- 7 The Kingfisher.
- 8 The Raven.
- 9 The Blue Titmouse.
- 10 The Coal-Titmouse.
- 11 Great Titmouse.
- 12 Marsh-Titmouse.
- 13 Bearded Titmouse.
- 14 The Brambling and Linnet.
- 15 The Fieldfare.
- 16 The Redwing.
- 17 Red Grouse.

- 18 The Mongolian Pheasant.
- 19 Common Pheasant.
- 20 The Great Bustards.
- 21 The Bittern.
- 22 Avocet.
- 23 The Woodcock.
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- 15 Pintail and Teal.
- 16 Red-Crested Pochard, Ferruginous Duck and Garganey.
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- 18 Red-Breasted Merganser, Smew and Goosander.
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- 21 Curlew and Great Snipe.
- 22 Common Snipe and Jack Snipe.

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BIRDS—LECTURE I.

- | | |
|-------------------------------------------|-----------------------------------------------|
| 1 Black Crow. | 32 Greater Puff-back Shrike. |
| 2 Head and Beak of Black Crow. | 33 Head and Beak of Greater Puff-back Shrike. |
| 3 Wattle Starling. | 34 Grey Cuckoo Shrike. |
| 4 Head and Beak of Wattle Starling. | 35 Southern Grey-headed Bush Shrike. |
| 5 Pied Starling. | 36 Nest of Bakhakiri Shrike. |
| 6 Red-shouldered Glossy Starling. | 37 Orange-breasted Bush Shrike. |
| 7 Black-headed Oriole. | 38 Black-collared Barbet. |
| 8 Nest of Black-headed Oriole. | 39 Head and Beak of Black-collared Barbet. |
| 9 Golden Oriole. | 40 Pied Babbler. |
| 10 Masked Weaver Bird. | 41 Sombre Bulbul. |
| 11 Nest of Pink-billed Weaver Bird. | 42 Cape Bulbul. |
| 12 Nest of Scaly-feathered Weaver. | 43 Nest of Cape Bulbul, with egg of Cuckoo. |
| 13 Nest of Weaver Bird. | 44 Cape Penduline Tit. |
| 14 Paradise Widow Bird. | 45 Grey-backed Warbler. |
| 15 Pin-tailed Widow Bird. | 46 Nest of Crombec Warbler. |
| 16 Common Waxbill. | 47 Ground-scraper Thrush. |
| 17 Black and Yellow Bishop Bird. | 48 Nest of Cape Rock Thrush. |
| 18 Capped Wheatear or Schnap-Wachter. | 49 Eastern Cape Grass Bird. |
| 19 Large Yellow Seed-eater. | 50 Cape Ground Robin. |
| 20 Nest of Large Yellow Seed-eater. | 51 Noisy Robin Chat. |
| 21 Cinnamon-backed Pipit. | 52 Head and Beak of Noisy Robin Chat. |
| 22 Orange-throated Lark. | 53 Nest of Silent Bush Robin. |
| 23 Rufous Long-hulled Lark. | 54 Paradise Flycatcher. |
| 24 Cape Wagtail. | 55 Head and Beak of Paradise Flycatcher. |
| 25 Ray's Yellow Wagtail. | 56 Nest of Paradise Flycatcher. |
| 26 Cape Long-tailed Sugar Bird. | 57 South African Hoopoe. |
| 27 Greater Double-collared Sun Bird. | 58 Head and Beak of South African Hoopoe. |
| 28 Fiscal Shrike (killing Cape Dormouse). | 59 European Bee Eater. |
| 29 Fiscal Shrike. | 60 Carmine-throated Bee-eater. |
| 30 Long-tailed Shrike. | 61 Rougous-cheeked Night Jar. |
| 31 Lesser Puff-back Shrike. | |

BYH THE NATURAL HISTORY OF SOUTH AFRICA.**BIRDS—LECTURE II.**

- | | |
|----------------------------------------------------------------------|-----------------------------------------------------------------------|
| 1 Malachite Kingfisher and Pair of Brown-hooded or Bush Kingfishers. | 38 Breeding Colony of Malagashes. |
| 2 Giant Kingfisher. | 39 Hammerkop. |
| 3 Pied Kingfisher. | 40 Nest of Hammerkop. |
| 4 Mouse Bird or Muis Vogel. | 41 Head and Beak of Hammerkop. |
| 5 Ground Hornbill. | 42 Dart or Snake Bird. |
| 6 Crowned Hornbill. | 43 Cattle Egret. |
| 7 Head and Beak of Crowned Hornbill. | 44 White Egret. |
| 8 Trumpeter Hornbill. | 45 Wood Ibis. |
| 9 Narina Trogon. | 46 Flamingo. |
| 10 Meyer's Parrot. | 47 Head and Beak of Flamingo. |
| 11 Head and Beak of Meyer's Parrot. | 48 South African Shelduck and Egyptian Goose. |
| 12 Ground Woodpecker. | 49 Cape Shoveller Duck. |
| 13 Cardinal Woodpecker. | 50 Head and Beak of Cape Shoveller Duck. |
| 14 Head and Beak of Cardinal Woodpecker. | 51 Red-eyed Dove. |
| 15 Nest of a Woodpecker. | 52 Nest of Turtle Dove. |
| 16 South African Wrenneck. | 53 Cape Quail. |
| 17 Sparrman's Honey Guide (Male). | 54 Nest of Quail. |
| 18 " " (Female). | 55 Red-necked Pheasant. |
| 19 Didrio Cuckoo. (Male.) | 56 Nest of Red-necked Bush Pheasant. |
| 20 Emerald Cuckoo. (Male.) | 57 Cape Redwing Partridge. |
| 21 Black and Grey Cuckoo. | 58 Black Crane. |
| 22 Black and Grey Cuckoo at nest of Cape Bulbul. | 59 Lesser Moor Hen. |
| 23 Great Spotted Cuckoo. | 60 Red-knobbed Coot at its nest. |
| 24 Black-crested Cuckoo. | 61 Black Stork and White Stork. |
| 25 Burchell's Coucal. | 62 Crowned Crane. |
| 26 Nest of Burchell's Coucal. | 63 Giant Bustard. |
| 27 Lourie or Plain-tail Eater. | 64 Blacksmith Plover. |
| 28 Spotted Eagle Owl. | 65 Riverside scene near Mantsburgh. Solitary Snipe and Painted Snipe. |
| 29 Barn Owl. | 66 Crowned Lapwing. |
| 30 Martial Eagle. | 67 Curlew. |
| 31 Little Sparrow Hawk. | 68 Head and Beak of Curlew. |
| 32 Black-shouldered Kite with nest and eggs. | 69 Avocet. |
| 33 Jackal Buzzard with nest and eggs. | 70 Greenshanks. |
| 34 Young Secretary Birds. | 71 Jackass Penguin. |
| 35 Secretary Bird in the act of killing a snake. | 72 Rock-Hopper Penguin. |
| 36 Kolhe's Vulture. | 73 Hen Ostrich. |
| 37 Cormorant. | |

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- | | | |
|---------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------|
| 1 Nightingale brooding Young. | 20 Peewit (or Lapwing), Nest and Eggs. | 40 Yellow Wagtail, Hen going to Nest with food. |
| 2 Nightingale at Nest. | 21 Swans, Hen on Nest, Cock near. | 41 Yellow Wagtail, both Parent Birds at Nest. |
| 3 Nightingale at Nest, alarmed by Noisy neighbours. | 22 Starling, adult on bough. | 42 Yellow Wagtail, Nest and Eggs. |
| 4 Nightingale, Nest and Eggs. | 23 Tree Pipit at Nest. | 43 Swallows, three Young on branch. |
| 5 Nightingale watching Young. | 24 Skylark leaving Nest containing Young. | 44 Swallows, Adult Male. |
| 6 Robin at breakfast table. | 25 Hedge Sparrow watching Young in Nest. | 45 Swallow, Adult Male. |
| 7 Robin at breakfast table—another view. | 26 Hedge Sparrow cleaning Nest. | 46 Great Whitethroat carrying food. |
| 8 Garden Warbler, Nest and Eggs. | 27 Hedge Sparrow, Nest and Eggs. | 47 Great Whitethroat brooding Young. |
| 9 Garden Warbler, brooding Young. | 28 Sedge Warbler at Nest with Young. | 48 Great Whitethroat Hen listening to her Mate's arrival. |
| 10 Garden Warbler—feeding time. | 29 Sedge Warbler, Hen at Nest. | 49 Great Whitethroat, Young one on bramble spray. |
| 11 Garden Warbler, Male at Nest. | 30 Sedge Warbler—adult on twig. | 50 Great Whitethroat Cock leaving Nest. |
| 12 Kingfisher watching for prey. | 31 Nightjar eggs <i>in situ</i> . | 51 Great Whitethroat Hen carrying food. |
| 13 Kingfisher on post in stream. | 32 Nightjar, Young. | 52 Great Whitethroat Hen cleaning Nest. |
| 14 Kingfisher on bough in stream. | 33 Nightjar brooding Young. | 53 Great Whitethroat, Nest and Eggs. |
| 15 Reed Bunting, Nest and Eggs. | 34 Bullfinch, feeding time, both Parent Birds at Nest. | 54 Song Thrush covering Young. |
| 16 Reed Bunting, Young One hiding in herbage. | 35 Bullfinch, both Parent Birds at Nest. | 55 Song Thrush watching Young in Nest. |
| 17 Partridge (English), Nest and Eggs. | 36 Reed Warbler, both Parent Birds at Nest. | |
| 18 Great Spotted Wood Pecker on tree trunk near nesting hole. | 37 Reed Warbler watching Young. | |
| 19 Yellow Hammer, Nest and Eggs. | 38 Reed Warbler, Cock at Nest. | |
| | 39 Willow Wren, Nest and Eggs. | |

X V**NESTING SWANS.**

Photographed from life by DOUGLAS ENGLISH, B.A.

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Book, "Beasties Courageous,"

- | | | |
|--------------------------------------|----------------------------------------------------------|-----------------------------------------------------|
| 1 Surroundings of Nest. | 10 Female Swan Trying Temperature of Water. | 17 Female Swan with Family. |
| 2 Male Swan Gathering Nest-material. | 11 " Coaxing Cygnets Down. | 18 Cygnet Climbing on its Mother's Back. |
| 3 Female Swan with Clutch of Eggs. | 12 Male Swan Coaxing Cygnets. | 19 Female Swan Sitting with the Cygnets Beside Her. |
| 4 " Dropping on Eggs. | 13 " Shaking Cygnets for Attempting to Climb his Back. | 20 Cygnets on their Mother's Back. |
| 5 Male Swan Charging on Land. | 14 The Family Afloat. | 21 " " " |
| 6 " Flying to Defend Nest. | 15 Back to the Nest: Male swan attending to straggler. | 22 " " " |
| 7 " Attacking Dog in Shallows. | 16 Female Pluming herself: One cygnet sitting on an egg. | 23 " " " |
| 8 " Rearing to Fly at Dog. | | 24 " " " |
| 9 Feeding Male Swan. | | 25 One Refractory Cygnet Left in Nest. |
| | | 26 Cygnets Feeding Themselves |
| | | 27 The Family Ashore. |

A S DICK'S DIVE IN THE DUCK POND.—ILLUSTRATING POND LIFE.*Beautifully Painted, £4 10s.; Plain Slides, £1 10s. the Set.*

READING FOR THE SET, including "Pond Life," 2s.

An Original Story and Illustrations.

- | | |
|-----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| 1 Dick Home for the Holidays, quite tired out the first day; falls asleep while looking into the Pond | 8 The Dytiscus Water Beetle and its large brown gruh with its formidable jaws |
| 2 Dick dreams he becomes very small, and dives into the Pond, and is introduced by a Frog to High Life below Water | 9 May Fly Larvae and Dragon Fly Larvae, and the fully developed May Fly; Gruh of Dragon Fly chasing Gruh of May Fly |
| 3 Dick's introduction to Hydras and Water Fleas | 10 Dragon Flies, the Larvae; the Fly leaving the pupa case; the perfect Insect with its beautiful lace-like wings |
| 4 Dick sees Caddis Flies and pays a visit to Colony of Caddis Worms and their queer little houses | 11 Little Dick and his friend the Frog narrowly escape being eaten by his Father's Duck when searching for his supper |
| 5 The Fighting Community; the Water Boatmen, Water Scorpions, and Ranatra Linearis | 12 Dick at Home again, and having seen so many wonderful and beautiful things, says, "All Thy works praise Thee, O Lord." |
| 6 Gnats and Gnat Larvae in their various stages | |
| 7 Dick visits the Water Spiders and their Diving Bell Homes, and observes the wonderful way they supply themselves with air | |

AT

POND LIFE.

A Series of direct Photo-micrographs.

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a Introduction	8 Dytiscus Beetle, Trachea	18 May Fly, Perfect Insect	28 Hydra Vulgaris
1 Dragon Fly, Larva of Demoiselle	9 Dytiscus Beetle, Eye	19 Caddis Worm	29 Water Flea
2 Dragon Fly, Demoiselle (large)	10 Gyrinus Beetle, larva	20 " Fly	30 Fish Parasite
3 Dragon Fly, Larva of	11 " Insect " Perfect	21 Pearl Fly	31 Palate of Water Snail
4 Dytiscus Beetle, larva	12 Gyrinus Beetle, legs	22 Water Scorpion	32 Vorticella
5 " " Mouth	13 Gnat Larva	23 Ranatra linearis	33 Group of selected Diatoms
6 Dytiscus Beetle, Leg showing suckers	14 " Pupa	24 Water Boatman	34 Volvox Globator
7 Dytiscus Beetle, Spiracle	15 " Male, plumed	25 Pond Skater, pupa	35 Desmids; Micrasterias denticulata
	16 Mosquito	26 " " Perfect Insect	36 Algae; Batrachospermum Moniliforme
	17 May Fly, Larva	27 Water Spider	

For additional Slides on Pond Life, see page 177. For a similar set to the above with lecture on "Common Insects," see page 187.

AKW

PHOTOGRAPHIC POND LIFE.

Made direct from the Original Negatives, many of the objects being Photographed alive.

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1 Bladderwort	22 Glass Larva
2 Vancheria	23 Tail of Glass Larva
3 Draparnaldia	24 Larva of Common Gnat
4 Volvox	25 Pupa of Common Gnat
5 Volvox more highly magnified	26 Common Gnat (female)
6 Various Diatoms	27 Common Gnat (male)
8 Amœba	28 Head of Common Gnat (male)
9 Melicerta—the Brickmaker	29 Common Water Flea
10 Stephanoceros, Crown Animalcule	30 Common Water Flea
11 Stentors, Trumpet Animalscule	31 Cyclops Quadricornis
12 Aloyonella	32 Water Mite
13 Froëelcella	33 Fresh Water Shrimp
14 Young Cristatella	34 Lestodora
15 Colony of Cristatella	35 Larva of Pond Skater
16 Lophopus Crystallinus	36 Pond Skater
17 Lophopus Crystallinus	37 Male Dragon Fly
18 Plumarella Repens	38 Fish Louse
19 Hydra Budding	39 Young Roach
20 Hydra swallowing Water Flea	40 Fairy Shrimps
21 Cordylophora	

ARC

MICROSCOPICAL POND LIFE.

From original drawings made directly from the living objects.

Some of these are not supplied as plain photographic Slides, but are tinted to correspond with the colours seen through the microscope. The prices are all given below.

INSECTS.

1 Mosquito Anopheles maculipennis. Male. 2s. 3d.	11 Mosquito Anopheles Culex pipiens Pupa. 2s. 9d.
2 " " " Female. 2s. 9d.	12 " " " " Pupae at surface of water. 2s. 9d.
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139 " " 2nd position. 2s. 9d.	191 " " " " " " Another view. 2s. 3d.
6 " " Cutex pipiens. Male. 2s. 3d.	16 " male. 2s. 3d. Culex putimens. Head. Female. 2s. 3d.
7 " " " Female. 2s. 3d.	17 Plume Gnat (Chironomus). Male. 2s. 3d.
8 " " " Female from above. 2s. 3d.	18 " Female. 2s. 3d.
9 " " " Larva. 2s. 9d.	19 Phantom Corethra plumicornis) Head of Larva. 2s. 3d.
10 " " " Larvae at surface of water. 2s. 9d.	20 " " " Tail of Larva. 2s. 3d.
136 " " " Head of Larva. 2s. 3d.	188 " " " Egg-mass. 2s. 3d.
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MICROSCOPICAL POND LIFE.—(Continued.)

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- 32 Freshwater Sponge. 2s. 9d.
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- 33 Amoeba radiosa. 2s. 9d.
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127 " ingesting a diatom. 2s. 9d.
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- 43 Acineta mystacina. 3s.
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59 Epistylis anastatica. 2s. 9d.
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174 " " " Part enlarged. 2s. 3d.
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57 Platycola decumbens. 2s. 9d.
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- 64 Hydra fusca. 2s. 9d.
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67 " " with young. 2s. 9d.
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- 85 Water Bear. 3s.

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159 " " Photo. 2s. 3d.
151 " " White background.
2s. 3d.
87 Cristatella young. 3s.
160 " mucedo. 2s. 3d.
168 Fredericella colony on submerged root. 2s. 3d.
169 " " twig. 2s. 3d.
170 " single polype. 2s. 3d.
171 " terminal polype. 2s. 3d.
172 " " higher magnification. 2s. 3d.

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- 88 Daphnia pulex. 3s. 6d.
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90 Simocephalus vetulus. 2s. 3d.
91 " " Front view. 2s. 3d.
92 " " Young. 2s. 3d.
176 Sida crystallina, bead and antennae, side view.
2s. 3d.
177 " " " " back view.
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178 " " bead, front view. 2s. 3d.
179 " " side view. 2s. 3d.
182 Moina rectirostris. 2s. 3d.
183 " " Antennae (dead specimen).
2s. 3d.
180 Eurycerus lamellatus. 2s. 3d.
181 " " Head larger. 2s. 3d.
93 Bosmina longirostris. 2s. 9d.
94 Cyclocypris serena. 2s. 9d.
95 Cyclops male. 2s. 3d.
96 " female. 2s. 3d.
97 " side view. 2s. 3d.
98 " showing feet. 2s. 3d.

MICROSCOPICAL POND LIFE—(Continued).

NEWTON—PAGE 180

- 99 *Cyclops serruatus* male. 2s. 3d.
 100 " " female. 2s. 3d.
 101 " " strenuus. 2s. 3d.
 102 *Cyclops* with parasitic verticillae. 2s. 3d.
 103 *Canthocamptus staphylinus*. 2s. 3d.
 103 *Canthocamptus staphylinus*. 2s. 3d.
 185 " " female with egg-sac. 2s. 3d.
 186 " " " side view. 2s. 3d.
 87 " " " limbs extended. 2s. 3d.

GENERAL.

- 104 Group of Protozoa and Infusoria. 3s. 6d.
 PHANEROGAMIA.
 118 Bladderwort with captured water-flea. 2s. 9d.
 184 Water-weed with oxygen bubbles. 2s. 3d.

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- 105 *Draparnaldia glomerata*. 2s. 9d.
 106 *Zygema*. 2s. 9d.
 107 *Spirogyra*. 2s. 9d.
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 108 *Batrachospermum*. 2s. 9d.

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 146 " " angulatum (high magnification). 2s. 3d.
 154 " " " 2s. 3d.
 156 *Pleurosigma angulatum*, x 900. 2s. 3d.
 149 " " formosum, x 1000. 2s. 3d.

- 112 *Surirella biseriata*. 2s. 9d.
 147 *Surirella gamma*, high magnification. 2s. 3d.
 148 *Navicula rhomboides*, high magnification. 2s. 3d.
 150 " " lyra " 2s. 3d.
 155 " " " " 2s. 3d.
 158 " " (dots), x 500. 2s. 3d.
 153 *Amphipleura pellucida*, high magnification. 2s. 3d.

- 113 *Epithemia turgida*. 2s. 9d.

- 114 *Pinnularia viridis*. 2s. 9d.

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- 192 A Colony of Zoophytes (*Bourgainvillia*) x 10. 2s. 3d.
 193 Single Individual of the Cluh Zoophyte (*Clava*) much enlarged. 2s. 3d.
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VP THE EVOLUTION OF A FROG.

A Series of X-Ray Lantern Slides on the Evolution from the Spawn through the Tadpole Stage to the Mature Frog, showing Absorption of the Tail and Development of Internal Organs and Skeleton.

Photographed from life by Mr. W. M. MARTIN, of Redruth.

Plain Slides, 2s. 3d. each.

The Herbivorous Period.

- 1 Spawn of Frog taken from a pool in February showing eggs embedded in a jelly-like string of mucilage
- 2 Showing young Tadpoles after they have jerked themselves out of the gelatinous mass, as yet mouthless and living on their still unexhausted capital of yolk
- 3 Showing development of a fish-like tail, and first appearance of portions of a short alimentary canal, also slight internal indications of the coming posterior legs
- 4 Showing the development of a more globular shape of body, with an elongation of alimentary canal and further internal development of posterior legs
- 5 First appearance of bone as two centres of ossification in head, also showing appearance of a rounded mouth and alimentary canal forming itself into a coil
- 6 Showing further development of bones of head and the alimentary canal coiled up like a watch spring and extending almost from side to side
- 7 Same period as No. 6, but radiographed through the sides and showing first appearance of centres of ossification of vertebral column
- 8 Same period as No. 6, with exposure governed to show the portions most transparent to X Rays, seen as white dots and possibly caused by weakening of tissue to allow of exit of posterior legs?

- 9 Showing first appearance externally of the posterior legs, both appearing simultaneously, body of Tadpole larger and more elongated, with development of a bigger tail for use as a powerful swimming organ
- 10 Same period as No. 9, with exposure to the X Rays so governed as to show the varying degrees of transparency of the skin
- 11 Showing appearance of two additional bone centres in head, Mouth more triangular in shape, Alimentary canal extending from side to side with an enlargement of its end on left
- 12 Alimentary canal becoming smaller, and in the two central Tadpoles, which have been kept without food, the bones of the head may now be seen articulated to the partially ossified vertebral column
- 13 Showing further development of the bones of head, Alimentary canal still diminishing in size and more confined to right side
- 14 Showing first indications of the coming forelimbs, and also that the right side of vertebral column ossifies sooner than the left
- 15 About a week later than No. 14, radiographed through the sides, showing small tongue affixed to the inner side of front of lower jaw, Also as an outgrowth from the hindermost vertebrae the long spine of the backbone (see full grown stage) may be seen partially developed

THE EVOLUTION OF A FROG—Continued

- 16 Showing final stage of development of tail to be absorbed as food in a later stage. Also the extent of development of posterior legs before the appearance of the fore limbs
- 17 Showing the fore limbs in process of unfolding. Alimentary canal much diminished in size, and situated almost entirely on right side
- Commencement of the Carnivorous Period.**
- 18 Almost sudden appearance of considerably developed fore limbs, and equally sudden disappearance of alimentary canal, where the latter is visible both fore limbs have not yet appeared. Also showing fore limbs do not appear simultaneously, either right or left coming first
- 19 The animal now leaps ashore. The Tadpole is becoming a Frog. The mouth has become wider, the abdomen shrunken. Transverse processes of vertebrae developing, and more Frog-like appearance evident, and being as yet unable to catch its own food, it begins living at the expense of its tail
- 20 Same period as No. 19. Caught in the grass near pool and radiographed through the side, showing partial absorption of tail. Appearance of stomach, absence of alimentary canal. *Compare with Radiograph of same position in Herbivorous period, No. 15*
- 21 About four days later than No. 20, showing the tail quarter part absorbed, and the long style of hinder-end of backbone, and produce of extremities of haunch-bones coming more plainly into view
- 22 Showing tail three-quarters absorbed, and legs growing longer
- 23 Showing tail externally completely absorbed, but portions still visible internally, and further development of the transverse processes of the vertebrae
- 24 Complete absorption of all trace of tail, and the young Frogs through living on their own tissue have become much smaller. Bony skeleton more developed. Tongue visible through the intermandibular space. First appearance of portions of hard undigested food
- 25 Showing the young Frogs, now able to capture their own food, regaining flesh. Further appearance of hard undigested portions of food. *Compare with No. 23*
- 26 Showing appearance and gradual development of lower jaw-bone. Further growth and ossification of the skeleton
- 27 Showing ossification of upper jaw-bone—Vertebral column wider and more defined—In specimen at bottom right corner the two cerebral hemispheres of brain are visible
- 28 Showing further growth of the Frogs, lengthening of limbs, and base of jaw-bone commencing to articulate with the vertebral column
Compare with No. 28
- 29 Showing partial ossification of joints of fore limbs
- 30 Further stages of ossification of joints of fore limbs, and of the articulation of jaw bone with vertebral column
- 31 Showing a greatly increased ossification of apex of vertebral column, previous to complete articulation with jaw-bones
- 32 Showing three stages of development of the cartilage of interior of head
- 33 Showing jaw-bones now articulated with vertebral column, transverse processes of vertebrae longer, and in the centre Frog the large free tongue may be seen in the intermandibular space
- 34 Young Frog, showing its characteristic deeply-notched free tongue
- 35 Same period as No. 34, radiographed through the side and showing an almost straight vertebral column and a thick well-developed tongue with its tip pointing down the throat
- 36 Showing further stage of ossification of the articulation of jaw and vertebral column. The innermost digit of top specimen swollen—male. In bottom specimen all the digits equal in size—female
- 37 Showing a larger space at the base between upper and lower jaws. Appearance of a ball and socket arrangement in joint of fore limbs
- 38 Same period as Number 37, radiographed through the side, showing development of a curve in vertebral column. *Compare with No. 35.* Also the relative positions of the urostyle and extension of haunch-bones, when in the act of leaping
- 39 A fully-developed Frog. In fore limbs showing four digits and radius and ulna completely fused together, a narrow line indicating the union. In hind limb, five toes and tibia and fibula fused
- 40 An old frog with broken leg. The hind legs placed in a position to show the separate bones of the elongated ankle and the "tarsal tubercle," or well-known hint of a sixth toe

For Slides on the Evolution of a Chicken see page 204.

B F Y

FISH LIFE.

By arrangement with Francis Ward, M.D., F.Z.S., F.R.P.S., we are privileged to publish the two following groups of slides from original negatives taken by him, and which appear in his well-known books, "Marvels of Fish Life," and "Animal Life under Water."

Beautifully Painted Slides, 6s. to 7s. 6d. each. Plain Slides, 2s. 6d. each.

- 1 Young Pike.
- 2 Young Pike in weeds.
- 3 Pike, third year.
- 4 Pike watching prey.
- 5 Pike advancing to attack.
- 6 Pike suddenly appears.
- 7 Pike disgusted after failure.
- 8 Perch ready to attack.
- 9 Perch advancing.
- 10 Perch in the open.
- 11 Perch paling with fear.
- 12 Perch eggs.
- 13 Perch hatching.
- 14 Ruff.
- 15 Carp.
- 16 Carp, Mouth of, Open.
- 17 Carp, Mouth of, Closed.
- 18 Carp, Throat teeth of.
- 19 Carp, Throat teeth showing triangular cartilaginous pad.
- 20 Crucian Carp.
- 21 Gudgeon.
- 22 Chub.
- 23 Chub. Throat teeth apart.
- 24 Chub. Throat teeth showing triangular cartilaginous pad approximated.
- 25 Dace.
- 26 Rudd.
- 27 Rudd taking worm.
- 28 Tench.
- 29 White Bream.
- 30 Stone Leach.
- 31 Stone Leach concealed.
- 32 Eel.
- 33 Stickleback building nest I

FISH LIFE.—Continued

- 34 Stickleback building nest II.
- 35 Stickleback building nest III.
- 36 Stickleback guarding nest.
- 37 Stickleback on guard.
- 38 Salmon egg and alevin.
- 39 Salmon hatching I.
- 40 Salmon hatching II.
- 41 Salmon hatching III.
- 42 Salmon hatching IV.
- 43 Salmon hatching V.
- 44 Salmon just hatched.
- 45 Salmon five weeks old.
- 46 Salmon scale. X 12.
- 47 Salmon scale. X 25.
- 48 Brown Trout eggs.
- 49 Alevin two weeks old.
- 50 Alevin five weeks old.
- 51 Adult brown trout.
- 52 Sea Trout.
- 53 Rainbow Trout.
- 54 Rainbow Trout rushing with open mouth for food—I.
- 55 Rainbow Trout rushing with open mouth for food—II.
- 56 Rainbow Trout, rushing with open mouth for food—III.
- 57 Trout fighting—I.
- 58 Trout fighting—II.
- 59 Trout fighting—III.
- 60 Windermere Charr.
- 61 Smelt.
- 62 Brown Trout laying in water hidden by reflection.
- 63 Brown Trout turning to pick worms and flashing as it catches the light from above.
- 64 Trout rising to fly, seen under water.
- 65 Trout yawning (Air. Lungs). Mouth closed.
- 66 Trout yawning (Air. Lungs). Mouth open.
- 67 Trout showing fear markings I.
- 68 Trout showing fear markings—II.
- 69 Trout showing fear markings—III.
- 70 Trout showing fear markings—IV.
- 71 Plaice eggs ready to hatch.
- 72 Plaice hatching—I.
- 73 Plaice hatching—II.
- 74 Plaice hatching—III.
- 75 Plaice larval fish hatched.
- 76 Flattening of the fish and rotation of cranium to adjust position of eyes.—I.
- 77 " " —II.
- 78 " " —III.
- 79 " " —IV.
- 80 " " —V.
- 81 " " —VI.
- 82 Plaice. Adult.
- 83 Plaice ooloths.
- 84 Sole.
- 85 Lemon sole.
- 86 Lemon sole on white background.
- 87 Lemon sole in natural surroundings—I.
- 88 Lemon sole in natural surroundings—II.
- 89 Turbot.
- 90 Thornback Ray. Egg of.
- 91 Thornback Ray. Egg of.
- 92 Thornback Ray. Embryo in egg.
- 93 Thornback Ray. Developing—I.
- 94 Thornback Ray. Developing—II.
- 95 Thornback Ray. Developing—III.
- 96 Thornback Ray. Back view of.
- 97 Thornback Ray. One month old.
- 98 Thornback Ray. Mouth of.
- 99 Thornback Ray on white background.
- 100 Thornback Ray in natural surroundings. Tail curled.
- 101 Thornback Ray in natural surroundings. Tail extended.
- 102 Dogfish. Egg of.
- 103 Dogfish. Egg attached to pipe in Aquarium.
- 104 Dogfish. Egg attached to rock.
- 105 Dogfish fixing egg on rocks.
- 106 Spined Dogfish—I.
- 107 Spined Dogfish—II.
- 108 Spined Dogfish laying at rest on fungus.
- 109 Spined Dogfish. Spine on first dorsal fin.
- 110 Spined Dogfish. Spine on second dorsal fin.
- 111 Dogfish. Nursehound.
- 112 Cottus scorpio at rest.
- 113 Cottus alarmed.
- 114 Cottus advancing to attack.
- 115 Cottus gibbo, Miller's Thumb.
- 116 Blenny alarmed.
- 117 Blenny anxious.
- 118 Blenny on defensive.
- 119 Black Blenny.
- 120 Pollock.
- 121 Whiting.
- 122 Ling.
- 123 Sand Eel. Mouth shut.
- 124 Sand Eel. Mouth open.
- 125 Pipe Fish.
- 126 Pipe Fish, mouth of.
- 127 Conger Eel.
- 128 Goldfish egg.
- 129 Goldfish. Larval. Just hatched.
- 130 Goldfish, six weeks old.
- 131 Goldfish, ten weeks old.
- 132 Goldfish. Adult.
- 133 Two Goldfish.
- 134 Carp. Swim bladder of.
- 135 Roach egg attached to roots.
- 136 Larval roach just hatched.
- 137 Larval Roach, first day. Sign of primitive swim bladder.
- 138 Larval Roach, second day. Gas in swim bladder.
- 139 Roach, eighteen days old.
- 140 Roach, twenty-one days old.
- 141 Roach, six weeks old.
- 142 Roach, adult fish.
- 143 Colour cells in skin of fish.
- 144 Whelk devouring crayfish.
- 145 Spiny Lobster.
- 146 Scallop, with valves closed. Pecten maximus.
- 147 Scallop, showing sensory tentacles.
- 148 Scallop, showing mantles.
- 149 Scallop, showing upper mantle and mantle cavity.
- 150 Scallop, showing general features. Pecten opercularis.
- 151 Scallop, showing eyes.
- 152 Scallop following spawn into the water I.
- 153 Scallop following spawn into the water—II.
- 154 Oyster spat, from Blackside oyster. Mature.
- 155 Oyster spat shell.
- 156 Oyster. Bundle of Broods.
- 157 Oyster shell.
- 158 Oyster shell.
- 159 Squat Lobster. Galathea Strigosa.
- 160 Spider Crab.
- 161 Shore Crab.
- 162 Crab. Swimming or Fiddler.
- 163 Crab. Swimming or Fiddler. Disturbed.
- 164 Hermit Crab in sponge.
- 165 Masked Crab.
- 166 Circular Crab.
- 167 Circular Crab. Disturbed.
- 168 Plumose Anemone and colony of young on rock.
- 169 Plumose Anemone.
- 170 Plumose Anemone. Open and closed.
- 171 Anemone Dahlia Wartlet. (Teutha crassicornis).
- 172 Anemone. Group of Dealia.
- 173 Anemone (Anemone sulcata).
- 174 Eledene, Octopus. Forced inspiration showing funnel action.
- 175 Eledene, Octopus. Forced expiration showing funnel action.
- 176 Eledene, Octopus, showing pigmentation.
- 177 Eledene, Octopus, showing general structure.
- 178 Eledene, Octopus, showing web between tentacles.
- 179 Eledene, Octopus advancing on tentacles—I.
- 180 Eledene, Octopus advancing on tentacles—II.
- 181 Eledene, Octopus advancing on tentacles—III.
- 182 Eledene, Octopus swimming.
- 183 Eledene, Octopus coming to rest—I.
- 184 Eledene, Octopus coming to rest—II.
- 185 Eledene, Octopus, fight with lobster—I.
- 186 Eledene, Octopus, fight with lobster—II.
- 187 Eledene, Octopus, fight with lobster—III.
- 188 Eledene, Octopus. Lobster killed by ink.
- 189 Eggs attacked by byssus—I.
- 190 Eggs attacked by byssus—Nine hours later.
- 191 Broken bottle dredged up.

FISH LIFE—(Continued).

ADDITIONAL SLIDES. (Knowledge Series).

Plain Slides, 2s. 3d. each.

- 192 Marked Plaice, which travelled 40 miles in 20 days, and was then recaptured (July 1905).
 193 Newly-batched Plaice (*Pleuronectes platessa*) (February, 1909).
 194 Early Post-larval Plaice (*Pleuronectes platessa*) (February, 1909).
 195 Early Post-larval *Pleuronectid* (February, 1909).
 196 Post-Larval Lemon Dab (*Pleuronectes microcephalus*) (February, 1909).
 197 Head of Post-larval Lemon Dab (*Pleuronectes microcephalus*) (February, 1909).
 198 Head of Post Larval Turbot (February, 1909).
 199 Post-larval Turbot (*Rhombus maximus*) (February, 1909).
 200 Early Post-larval Thickback Sole (*Solea variegata*) (February, 1909).
 201 Post-Larval Ling (*Molva molva*) (February, 1909).

B R R

ANIMAL LIFE UNDER WATER.

A Series of slides from original negatives and drawings on the observation of Water Birds, Animals and Fishes, showing their feeding habits and haunts.

Beautifully Painted, 7s. Plain Slides, 2s. 6d.

Text Book, "Animal Life under Water," by FRANCIS WARD, M.D., F.Z.S., F.R.S.S., etc.

- 1 A Highland Loeb and under-water view of the scene.
- 2 Lesser Black-backed Gull, Penguin and Rainbow Trout.
- 3 Appearance from under the water when the subject is partially above and partially below the surface.
- 4 Methods of Subaqueous Observation.
- 5 Observation Tank in the bank of a controlled stream.
- 6 White Cardboard reflecting green colouration in a pond.
- 7 White Anemone. I.
- 8 " " II.
- 9 " " III.
- 10 Water Hen swimming in the area of total reflection.
- 11 " " II.
- 12 White Saucer floating on the surface of the water seen from below in the area of total reflection and in the "window."
- 13 Common Brown Trout reflecting its surroundings.
- 14 Brown Trout waiting for food.
- 15 The "flash" as the Trout turns to pick up a worm.
- 16 Cormorant with berring.
- 17 A flashing fish.
- 18 Cormorant with wings extended.
- 19 " swimming on the surface.
- 20 " splashing head under water.
- 21 " swimming forward with head under.
- 22 " Composite slide of three above movements.
- 23 " dipping in search of fish.
- 24 " Under water-view, appearance of head.
- 25 " Under-water view of a chase. I.
- 26 " " " " " " " " II.
- 27 " " " " " " " " III.
- 28 " " " " " " " " IV.
- 29 " " " " " " " " V.
- 30 " diving.
- 31 " catching a fish.
- 32 " floating up with fish. I.
- 33 " " " " " " " " II.
- 34 Cormorant swimming ashore seen from below.
- 35 " " " " " " " " above.
- 36 " digesting a meal on a rock.
- 37 Penguin on land.
- 38 " under water with fish.
- 39 " in dark water.
- 40 " on surface.
- 41 " under water swimming towards observer.
- 42 " " " " " " " " away.
- 43 " Composite film picture, turning fish.
- 44 " " " " " " " " swinging up to surface.
- 45 Otter cub wandering from Hover.
- 46 " Mother at Hover.
- 47 " entering water.
- 48 " slipping into water.
- 49 " Under-water view swimming.
- 50 Otter Under-water view searching for fish.
- 51 " " " " " " " " swinging up to surface.
- 52 " " " " " " " " swimming on surface.
- 53 " landing with fish.
- 54 " eating 2lb. sea trout.
- 55 " stopping for a drink.
- 56 " returning for another.
- 57 " chewing a sea trout.
- 58 " under a rock in the water.
- 59 " playing with a pike under water.
- 60 An Otter's "seal."
- 61 Otter going under the ice.
- 62 " coming up through the ice.
- 63 " alert on hind legs.
- 64 " snarling.
- 65 " tail movements, composite under-water study.
- 66 Seal climbing on to rocks.
- 67 " struggling over boulder.
- 68 " basking in the sun.
- 69 " alarmed.
- 70 " plunging into the sea.
- 71 " vortex where it disappeared.
- 72 " under-water view searching for fish.
- 73 " " " " " " " " catching a herring.
- 74 " " " " " " " " chewing a herring.
- 75 " " " " " " " " swinging up to the surface.
- 76 " Head above water.
- 77 Heron's young on nest.
- 78 Heron young bird ready to fly.
- 79 " flight, going off.
- 80 " " wing span.
- 81 " " alighting.
- 82 " shaking feathers after flight.
- 83 " fishing attitude.
- 84 " wading.
- 85 " fishing.
- 86 " seen below water.
- 87 " wading, seen from under water.
- 88 " above water against sky.
- 89 " body and head seen from below.
- 90 " " " " " " " " against reeds.
- 91 " as seen from above water.
- 92 " A meal, 39 whiting in one night.
- 93 " disturbed while fishing. I.
- 94 " " " " " " " " II.
- 95 " " " " " " " " III.
- 96 Gull. Lesser black-backed on rocks.
- 97 " " " " " " " " on water.
- 98 Gull. Lesser black-backed landing on water seen from below.
- 99 " " " " " " " " swimming on surface seen from below.
- 100 " " " " " " " " plunging down after fish seen from below.
- 101 " Black headed, stomach contents. Natural size.
- 102 " " " " " " " " Air vesicle magnified 15 diameters.
- 103 " " " " " " " " " "

ANIMAL LIFE UNDER WATER—Continued.

104	Gull. Herring. Stomach contents.	Otoliths and Air Vesicles as indication of feeding.	117	Kingfisher. Young waiting to be fed.
105	"	"	118	" Alert.
106	" Percentage Table of Contents of the Sea food of Herring, Common and Black-headed.	"	119	" A large fish.
107	" " " " " " " " " " " "	"	120	" Haunt.
108	" Herring, Stomach Contents, 140 grms.	"	121	Angler Lures. Dry fly as seen by a trout.
109	" Black-headed, Stomach Contents. Crane Flies.	"	122	" " " " " " " " " " " "
110	" " " " " " " " " " " "	"	123	" " " " " " " " " " " "
111	Kingfisher. Nesting Hole.	"	124	" " " " " " " " " " " "
112	" A Fish.	"	125	" " " " " " " " " " " "
113	" The Dive.	"	126	" " " " " " " " " " " "
114	" The Capture.	"	127	" " " " " " " " " " " "
115	" Gone.	"	128	" " " " " " " " " " " "
116	" After dinner rest awhile. Repose after a meal.	"	129	" " " " " " " " " " " "
		"	130	" " " " " " " " " " " "
		"	131	" " " " " " " " " " " "
		"	132	" " " " " " " " " " " "
		"	133	" " " " " " " " " " " "
		"	134	" " " " " " " " " " " "

AY

BUTTERFLIES, INSECTS, ETC.

Photographed direct from the real objects.

Plain Slides 2s: each except where otherwise marked.

1	Tortoiseshell Butterfly and the underside.	45	Caterpillar of Comma Moth.
2	<i>Vanessa Urtica</i> .	46	Two Caterpillars of Comma Moth.
3	Small Tortoiseshell Butterfly.	47	Caterpillar of Ermine Moth.
4	Brimstone Butterfly, and the underside.	48	Caterpillar on Euonymus, in Web.
5	<i>Gonetheryx Rhamni</i> .	49	" feeding in Web.
6	Peacock Butterfly and the underside.	50	Caterpillar, "Geometer, representing a Stick.
7	<i>Vanessa Io</i> .	51	Indian Long Horn Beetle.
8	Marble White Butterfly and the underside.	52	Great Silver Beetle. <i>Hydrophilus Picus</i> .
9	<i>Arge Galathea</i> .	53	Sailor Beetles.
10	Meadow Brown Butterfly and the underside (Male).	54	Musk Beetle. <i>Aromia</i> or <i>Cerambyx Moschatus</i> .
11	<i>Hipparchia Janira</i> .	55	Stag Beetle. <i>Lucanus Cervus</i> .
12	Ringlet Butterfly. <i>Hipparchia Hypanthus</i> .	56	Cockroach. <i>Blatta</i> .
13	Red Admiral Butterfly. <i>Vanessa Atalanta</i> .	57	Dragon Fly.
14	" " " " " " " " " " " "	58	" " (Male).
15	" " " " " " " " " " " "	59	" " Demotsele.
16	" " " " " " " " " " " "	60	Smoked-winged Dragon-flies (Male and Female).
17	Large Skipper Butterfly. <i>Ramphela Sylvanus</i> .	61	Chinese Lantern Fly.
18	Painted Lady Butterfly. <i>Cynthia Cardin</i> .	62	Drone Fly on Sunflower.
19	Painted Lady Butterfly.	63	Ant Lion.
20	Small Heath Butterfly. <i>Canonympha Pamphilus</i> .	64	Garden Snails feeding on Leaf.
21	Orange Tip Butterfly. <i>Euchloe Cardaminis</i> .	65	" " " " on top of Flower.
22	Small Blue Butterfly. <i>Polyommatus Alas</i> .	66	Large Green Grasshopper.
23	Small Garden White Butterfly.	67	Frog Hopper, Stag Horn. Indian Tea Tree.
24	Small Pearl-bordered Butterfly.	68	Aphis on Leaf Stalk.
25	Indian Butterfly.	69	Black Ants.
26	" " " " " " " " " " " "	70	Earwigs.
27	" " " " " " " " " " " "	71	Spiders.
28	" " " " " " " " " " " "	72	Three Scorpions.
29	Various Wings of Butterflies.	73	Scorpion, underside.
30	Spurge Hawk Moth.	74	" " three-quarters.
31	Convolvulus Hawk Moth.	75	Water Scorpion.
32	Privet Hawk Moth.	76	Shrimp.
33	Poplar Hawk Moth.	77	Freshwater Shrimp.
34	The Eyed Hawk Moth.	78	Centipede.
35	Large Elephant Hawk Moth.	79	Star Fish.
36	Lime Hawk Moth.	80	" " 5 Ray and 13 Ray.
37	Ghost Moth.	81	Dytiscus, Water Beetle.
38	Old Lady Moth.	82	Group of Larva of Dytiscus Marginalatus.
39	Red Underwing Moth.	83	Water Mantis, <i>Ranatra Linearis</i> .
40	Yellow Underwing Moth.	84	Crah.
41	Scarlet Tiger Moth.	85	Unfolding Wings of Insects. Crumpled appearance of the wings upon emergence from the nymph skin. 2s. 3d.
42	Buff Tip Moth.	86	" " " " " " " " " " " "
43	Swallow-tailed Moth.	87	" " " " " " " " " " " "
44	Large American Silkworm Moth.		
45	Current Moth.		
46	Death's Head Moth.		
47	Emperor Moth.		
48	Moth of the Vegetable Caterpillar. <i>Hepialus Virescens</i> .		
49	Skin of Caterpillar of Emperor Moth.		
50	" " " " " " " " " " " "		
51	Vegetable Caterpillar of New Zealand.		

For "Natural History Talks" on "Fishes," see pages 155 and 158.

AX BRITISH BUTTERFLIES AND MOTHS.

Photographed from a very beautiful and accurate Series of Original Drawings.

Beautifully Painted 6s. ; Plain Slides, 2s. each.

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| <ol style="list-style-type: none"> 1 Slide containing 12 Butterflies and Moths for Wing Development 2 Swallow-tail Butterfly. <i>Papilio Machaon</i> 3 Swallow-tail Scarce Butterfly. <i>Papilio Podalirius</i> 4 Apollo Butterfly. <i>Parnassius Apollo</i> 5 Clouded Yellow Butterfly. <i>Colias Hyale et Edusa</i>. On Clover 6 Red Admiral Butterfly. <i>Vanessa Atalanta</i> 7 Camberwell Beauty Butterfly. <i>Vanessa Antiope</i> 8 Peacock Butterfly. <i>Vanessa Io</i> 9 Tortoiseshell and Comma Butterfly. <i>Vanessa Urtica et C. Album</i> 10 Painted Lady Butterfly. <i>Vanessa Cardui</i>. On thistle 11 Silver-washed Fritillary Butterfly. <i>Argynnis Paphia</i>. On pansy 12 Purple Emperor Butterfly. <i>Apatura Iris</i>. On poplar spray 13 Marble White Butterfly. <i>Melanargia Galathea</i> 14 <i>Hipparchia Circe</i> 15 Death's Head Moth. <i>Acherontia Atropos</i> 16 Convolvulus Hawk Moth. <i>Sphinx Convolvulus</i> | <ol style="list-style-type: none"> 17 Humming Bird Hawk Moth. Larva and pupa <i>Microglossa Stellatarum et Groatia</i>. On he straw 18 Broad and Narrow Bordered Bee-Hawk Moths. <i>Hemaris Bombyliformis et Fuciformis</i>. On honeysuckle 19 Burnett Moths, six and five spot. <i>Zygonia Fritipendula et Lonicera</i>. On clover 20 Scarlet and Jersey Tiger Moths. <i>Callimorpha Dominula et Hera</i>. On nettle 21 Garden and Cream Spot Tiger Moths. <i>Aretia Caja et Villica</i>. On blackberry spray 22 Emperor Moths, male and female. <i>Saturnia Carpius</i>. On spray of wild rose 23 Oak Egger Moths. <i>Lasiocampa Quercus</i>. On blackberry 24 Puss Moth. <i>Cerura Vinula</i>. On willow 25 Common Yellow Underwing Moths. <i>Triphena Pronuba</i>. On primrose 26 Crimson Underwing Moth. <i>Catocala Sponsa</i>. On oak spray 27 Clifton Nonpareil Moth. <i>Catocala Frazzina</i>. On poplar |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

ABT LIFE HISTORY OF VARIOUS INSECTS.

A Series of Lantern Slides photographed direct from the actual objects, and showing on the one slide the perfect insect, male and female, the caterpillar, and the chrysalis. The colouring is copied from the insects themselves, to secure accuracy, and the resulting slides are exquisitely delicate and beautiful.

Plain Slides, 2s. each ; Beautifully Painted, best quality, 6s. each.

- | MOTHS. | | BUTTERFLIES. |
|---------------------------------------------|--------------------------------------------------------|---------------------------------------------|
| Male and Female, Pupa and Larva. | | 19 Swallow Tail, <i>Papilio Machaon</i> . |
| 1 Eyed Hawk, <i>Sphinx Ligustri</i> | 8 Poplar Grey, <i>Acronycta Megacephala</i> . | 20 Red Admiral, <i>Vanessa Atalanta</i> . |
| 2 Lime Hawk, <i>Smerththus Tillæ</i> . | 9 Six Spotted Burnet, <i>Anthoercoce Filipendule</i> . | 21 Small Garden White, <i>Pieris Rapæ</i> . |
| 3 Poplar Hawk, <i>Smerththus Populi</i> . | 10 Maggie or Currant, <i>Ahraxus Grossulariæ</i> . | 22 Mole Cricket, Flying, and in Burrow. |
| 4 Privet Hawk, <i>Sphinx Ligustri</i> . | 11 Silkworm, <i>Bombyx Mori</i> . | 23 Scorpions from Spain. |
| 5 Lappet Moth, <i>Bombyx Querquifolia</i> . | 12 Buff Tip, <i>rygera Bucephala</i> . | 24 Great Silver Beetle. |
| 6 Drinker, <i>Odonestris Potatoria</i> . | 13 Puss Moth, <i>Cerura Vinula</i> . | 25 Goat Moth. |
| 7 Oak Egger, <i>Lasiocampa Quercus</i> . | 14 Red Underwing, <i>Catocala Sponsa</i> . | 26 Swallow-tail Moth. |
| | 15 Tiger Moth, <i>Aretia Caja</i> . | 27 Privet Hawk. |
| | 16 Sycamore Tussock, <i>Congli Demas</i> . | 28 Great Water Beetle. |
| | 17 Goat Moth, <i>Cossus Ligniperda</i> . | |
| | 18 Gipsy Moth, <i>Porthetola Dispar</i> . | |

For additional Slides on "Insects" see Index.

A FE SPIDERS.

From Direct Negatives.

Plain Slides, 2s. each.

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ol style="list-style-type: none"> 1 Spider's Nest, showing Eggs just before Hatching. 2 Spider's Nest, showing the Shells directly after the Spiders have left the Eggs. 3 Garden Spider and its Web 4 " " Magnified. 5 " " The Spinnerets. 6 " " The Foot, showing the Comb Formation of the Claw. 6a Spider's Foot. x 25. 7a " Tongue. x 35. 8 " " Mandibles of the Male Spider. 9 " " Eyes of. 9 Spider, Bush. 10 " Cellar. | <ol style="list-style-type: none"> 11 Spider, Crab. 12 " Ground. 13 " Jumping. 14 " Trapdoor, Young. 15 " Water. 16 " Wolf. 17 " Spiny, from Trinidad. 18 Foot of Bird-catching Spider. 19 Hair of Bird-catching Spider, showing the fluted ends and fine hairs, x 300. 20 Nest of Harvest Spider in Seed-head of Grass. 21 Spider. Zehra. |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

BYP LIFE HISTORY OF THE ANT.

A series of 30 Slides. Detailed list will be sent on application.

Coloured Slides, 6s.

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BVP**FLIES—THEIR VARIOUS SPECIES.***Plain Slides, 2s. 3d. each.*

- | | |
|-------------------------------------------|----------------------------------------------|
| 1 House Fly from mounted specimen. | 24 Blow Fly. Tongue of (highly magnified). |
| 2 " " killed by fungus. | 25 " " Tongue of Central tube. |
| 3 " " Section through whole (V.S.). | 26 " " Spiracle. |
| 4 " " Foot with hairs and pad. | 27 " " Tracheal tubes. |
| 5 " " Antennae. | 28 " " Oral lobes. |
| 6 " " Eye (V.S.) | 29 " " Eggs of. |
| 7 " " Eye. | 30 " " pupae. |
| 8 " " Spiracle and part of skin with hair | 31 Biting Fly (Stomoxys calcitrans) Foot. |
| 9 " " Tracheae and Spiracle. | 32 Bot Fly. Larva in egg. |
| 10 " " Wing. | 33 " " eggs. |
| 11 " " Tongue. | 34 " " of Ox. (Hypoderma covis). |
| 12 " " Section of. | 35 " " of Sheep. |
| 13 " " Eggs of (Cluster). | 36 Corn Fly. |
| 14 " " Ovipositor with eggs in situ. | 37 Dancing Fly. (Hilara ciliipes) Female. |
| 15 " " Larva of. | 38 Dung Fly. (Scatophaga stercoraria). Feet. |
| 16 " " Parasite of. | 39 Fantail Fly. Male. |
| 17 Chelifer Fly. Eggs of. | 40 Fruit Fly. |
- BLOW-FLY.**
- | | |
|---------------------------------------------|-------------------------------------|
| 18 Blow Fly | 41 Gad Fly. Lancets of. |
| 19 " " Anatomy of. Various parts dissected. | 42 Green Bottle Fly. Head. |
| 20 " " Head. (Front View.) | 43 Hessian Fly. |
| 21 " " Eye. | 44 Wheat Midge. |
| 22 " " Foot. | 45 Tsetse Fly. (Glossina palpalis). |
| 23 " " Tongue of. | 46 Tropical and Malerial Fly. |
| | 47 Yellow Fever Fly. |

See also **ABZ** "The Danger of Flies," Medical, Section I of this Catalogue.

ABS THE LIFE HISTORY OF A BRITISH MUD-WASP **ODYNENIS SPINIPES.**

Photographed from Life by DOUGLAS ENGLISH, B.A., F.R.P.S.

Coloured Slides, 6s.; Plain Slides, 2s. 6d. each.

- | | | |
|----------------------------------------------------------------------------------|---------------------------------------------------------------------------------|------------------------------------------------------------------|
| 1 The Mud-Wasp, O. Spinipes, Back. | 8 Section of New Burrow, showing Suspended Egg and First Caterpillar. | 14 Wasp Grub, surrounded by Store of Caterpillars. |
| 2 The Mud-Wasp, O. Spinipes, Side. | 9 Section of Burrow, with Store of Caterpillars. | 15 Wasp Pupa. |
| 3 The Mud-Wasp, O. Spinipes, Three-quarters. | 10 Section of Burrow, with Store of Caterpillars, with Partition half-way down. | 16 Wasp bringing Caterpillar to Burrow Entrance, Side. |
| 4 General View of a Collection of Burrows, with Tubular Crows. | 11 Section of Burrow, showing Wasp Grub Feeding. | 17 Wasp bringing Caterpillar to Burrow Entrance, Three-quarters. |
| 5 General View of a Collection of Burrows, with Tubular Crows, after Rain-storm. | 12 Section of Burrow, showing Wasp Grub Full Fed. | 18 Wasp Repairing Burrow Entrance. |
| 6 Wasp commencing a Burrow. | 13 Section of Burrow, showing Wasp Pupa in Cocoon. | 19 Wasp Hanging on Burrow Entrance, Side. |
| 7 " " Side. | | 20 Wasp Hanging on Burrow Entrance, Back. |

AV**INSECT MIMICRY.**

Photographed from Original Drawings.

Beautifully Painted, 6s.; Plain Slides, 2s. each.

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|-----------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| 1 Butterfly, <i>Kallima Maches</i> | 19 Larva of Buff-tip Moth, <i>Pygma Bucephala</i> |
| 2 Walking Stick Insect, <i>Phasma Australia</i> | 20 " " Cinnabar Moth, <i>Euclyptus Jacobae</i> |
| 3 Spectre, <i>Spectrum Rossia</i> | 21 Satin and Gold Tail Moth on Ivy |
| 4 " " <i>Phasma Senifolia</i> | 22 Drone Fly and Hive Bee, <i>Eristalis tenax et Apis Mellifica</i> , on Carrot Blossom |
| 5 Walking Leaf Insect, <i>Phyllium Siccifolium</i> | 23 Larva of Large Elephant Hawk Moth, <i>Charo-campa Elyenor</i> |
| 6 " " " <i>Mantis Bepinosa</i> | 24 Larva of Small Elephant Hawk Moth, <i>Charo-campa Porcellus</i> |
| 7 " " " <i>Mantis Strumaria</i> | 25 Larva of Small Elephant Hawk Moth, <i>Charo-campa Porcellus</i> , terrifying attitude |
| 8 Water Measurer, <i>Typhala Ichneumonaria</i> | 26 Larva of Puss Moth, <i>Cerura Vinula</i> , full fed and normal |
| 9 Larva of Swallow-Tail Moth, last stage, <i>Oncideres Sumbucaria</i> | 27 Larva of Puss Moth, <i>Cerura Vinula</i> , terrifying attitude |
| 10 Twig of Currant, the general appearance much like that of No. 9 | 28 Larva of Puss Moth, <i>Cerura Vinula</i> normal, on Willow |
| 11 Larva of Peppered Moth, <i>Amphidax Betularia</i> | 29 Larva of Puss Moth, <i>Cerura Vinula</i> , one of the Pink Whips completely protruded |
| 12 " " Early-thorn Moth, <i>Selema Illusaria</i> | 30 Larva of Lobster Moth, <i>Stauropus Pagi</i> |
| 13 " " Brimstone Moth, <i>Rumia Crataegata</i> | 31 Asiatic Lizard, <i>Phrynocephalus Mystaceus</i> |
| 14 " " Emerald Moth, <i>Geometra Papilionaria</i> | |
| 15 Spiders, <i>Cavostria mitralis</i> , in profile | |
| 16 " " <i>Epeira prompta</i> , resting on Heben covered tree | |
| 17 Pupa of Indian Mantis, <i>Hymenopus bicornis</i> | |
| 18 Larva of Magpie Moth, <i>Abraxas Grossulariata</i> | |

NOTE.—When ordering Slides the Telegraphic Code Letters should be quoted to avoid mistakes.

T I HIDDEN BEAUTIES OF NATURE.

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Descriptive Lecture for the 59 Slides 1s. 3d. Plain Slides, 2s. each.

- 1 The Beautiful Floeule (*Floesularia ornata*). Below the range of unassisted sight. Found in Pond water
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- 3 Another form of "Glass Sponge" (*Euplectella suberona*).
- 4 Another Glass Sponge (*Euplectella cucumer*)
- 5 A Glass Sponge (*Hegadella Phœnia*)
- 6 " (*Euplectella aspergillum*)
- 7 " (*Euplectella Jovis*)
- 8 Sponge Spioules (Microscopic)
- 9 A thin section of the Spine of a Sea-Urchin, $\frac{1}{16}$ th of an inch in diameter
- 10 Transverse sections of Spikes of Sea-Urchins. Enlarged
- 11 Parts of Sea-Urchin. Reduced
- 12 The Echinus, or Sea-Urchin. The Spikes removed
- 13 Some of Nature's Fireworks. Organisms which cause the phosphorescence of the Sea
- 14 Globigerina bulloides. Very greatly magnified. "Atlantic Ocean" from a depth of 2½ miles
- 15 A thin Slice of Chalk. Very greatly magnified.
- 16 Polycystina. The composition of the Rocks of Barbados. Enlarged several hundred diameters
- 17 Polycystina, Island of Barbados. Enlarged many hundred diameters
- 18 Radiolaria, Challenger Series
- 19 " " " (*Tuscarora*)
- 20 " " " "
- 21 " " " "
- 22 " " " "
- 23 " " " "
- 24 " " " "
- 25 " " " "
- 26 " " " "
- 27 " " " "
- 28 " " " "
- 29 " " " "
- 30 " " " "
- 31 " " " "
- 32 " " " "
- 33 A Radiolarian, Challenger Series
- 34 Triceratium. A Diatom enlarged several hundred diameters
- 35 Heliopeita. Enlarged several hundred diameters
- 36 Coscinodiscus radiatus. A Diatom enlarged several hundred diameters
- 37 Eggs of a tiny Moth. Enormously magnified
- 38 Foraminifera. Greatly enlarged
- 39 (A) Eneinite Limestone
- 40 (B) Nummulitic Limestone
- 41 (C) Coralline Limestone
- 42 Diffugia, Fresh-water Rhizopods (after Leidy). Ranging from the $\frac{1}{16}$ th to the $\frac{1}{32}$ th of an inch in diameter
- 43 Nebula, Fresh-water Rhizopods (after Leidy). All are below the $\frac{1}{32}$ th of an inch in diameter
- 44 Hyalosphænia papilio (after Leidy). Ranging from $\frac{1}{16}$ th of an inch to the $\frac{1}{32}$ th of an inch
- 45 Clathrulina elevans, Fresh-water Rhizopods (after Leidy) Diameter $\frac{1}{16}$ th of an inch
- 46 Arcella, Fresh-water Rhizopods (after Leidy) From $\frac{1}{16}$ th of an inch to $\frac{1}{32}$ th of an inch
- 47 Cyphoderia, Fresh-water Rhizopods (after Leidy) $\frac{1}{32}$ th of an inch in diameter
- 48 Coral Polyps
- 49 Corals with extended Polyps
- 50 Madreporæ. (South Kensington Natural History Museum)
- 51 Madreporæ ovifera
- 52 Building Rotifer (*Meliceria ringens*) $\frac{1}{16}$ th of an inch in length
- 53 Volvox Globator $\frac{1}{16}$ th of an inch in diameter
- 54 Snow Crystals
- 55 Crystals formed by breathing on a window during frost. The photograph, taken through the microscope by Dr. Maddox, embraced only $\frac{1}{16}$ th of an inch
- 56 A small portion of Eye of Water Beetle (*Dytiscus marginatus*). Enormously magnified
- 57 A small portion of Eye of House fly
- 58 A portion of a Blow-fly's Proboscis. Enormously magnified
- 59 Four Flints, showing Silicified Sponges, known as "Chacoites"
- 60 Silicified Sponges in Flint
- 61 A Glass Sponge fossilised in Chalk. *Guetardina Stellata* (Michelin) *Brachiolites Angularis* (Toalmin Smith)

For other Slides of these subjects, see Index & Science, Section 2, of this Catalogue.

A P COMMON INSECTS AS SEEN THROUGH THE MICROSCOPE.

These Lantern Slides have been photographed direct from the natural objects, by means of their Patent Microscopic Lantern Attachment, and are exceedingly bright and sharp, showing the fine detail very clearly.

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- | | | |
|---------------------------------------|----------------------------|--------------------------------|
| a Introduction | 12 The Spider | 25 Human Flea, female |
| 1 The Cuckoo Spit | 13 " Spinnerets | 26 " Bug |
| 2 The Aphid | 14 " Foot of | 27 Parasite of Sheep |
| 3 Ladybird, Larva | 15 House-fly | 28 " Pig |
| 4 " full-grown beetle | 16 " Foot | 29 " Flying Fox |
| 5 Indian Tortoise Beetle | 17 " Eye | 30 Hive Bee's Tongue |
| 6 English Wood Ant | 18 Head of Crane-fly | 31 " Leg, showing Pollen |
| 7 Aot-Hon | 19 Proboscis of Blow-fly | 32 " Wing showing Hooklets |
| 8 Tra-bea of Silkworm | 20 " more highly magnified | 33 " Sting showing Barbs |
| 9 Tracheal Tube more highly magnified | 21 Saws of Saw-fly | 34 Head of Butterfly |
| 10 Spiracle of Beetle | 22 Ichneumon-fly | 35 Antennæ of Moth |
| 11 Gizzard of Cricket | 23 Indian Fire-fly | 36 Dust from wing of Butterfly |
| | 24 Human Flea, male | |

For a similar set to this, with Lecture on "Pond Life," see page 178.

MICROSCOPIC OBJECTS ENLARGED AND PHOTOGRAPHED FOR THE LANTERN.

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INSECTS, ETC.

- 1 Ant, Forest.
- 2 " Parasol.
- 3 " Garden.
- 4 " House.
- 5 Aphid, Pupa.
- 6 Section of Bee's Eye, x 40.
- 7 Eye of Beetle, showing a picture (Portrait of the King) in each lens, 2s. 6d.
- 8 Trophy of Dor Beetle, *Geotrophes mutatus*, showing the parts of the head dissected.
- 9 Anatomy of the Blow-fly, *Musca vomitoria*. The whole insect dissected and parts separated on the one slide.
- 10 Blow-fly, Female.
- 11 " Central Tube of Tongue highly magnified.
- 12 Plant Bug, *Tingo cardui*.
- 13 Plant Bug.
- 14 Antennae of Cockchafer.
- 15 Spiracle of Fly.
- 16 Fruit Fly, *Trypeta*.
- 17 Wing of Lacewing Fly.
- 18 Parasitic Fly, *Conops quadri-fasciata*.
- 19 Window Gnat.
- 20 Gooseberry Sawfly.
- 21 Haliotes Tulerulata, Palate.
- 22 Labrum Moth.
- 23 Head of Silkworm Moth.
- 24 Eggs of House Fly.
- 25 " Parasite of Ground Hornbill.
- 26 " Parasite of Reeves' Pheasant.
- 27 " Parasite of Goose.

- 28 Scales of Insects arranged as a Basket of Flowers and Butterflies.
- 29 Spicules of Synapta.
- 30 Spine of Acrocladia. T.S.
- 31 Spines of Star-fish.
- 32 " Young Echinus.
- 33 Spine of Echinus. T.S.
- 34 Sting of Wasp compared with Eye of Smallest Needle.
- 35 " with Point of "
- 36 Hydroid Zoophyte with tentacles extended. *Obelia flabellata*.
- 37 Bryozoa Malaga.

BOTANICAL.

- 38 Sunflower Stem. T.S.
- 39 Seed of *Nemesia strumosa*.
- 40 Leaf of *Drosera rotundiflora*, showing captured insect.
- 41 Maidenhair Fern.
- 42 Section of Bamboo Canes.
- 43 " Pepper.

FORAMINIFERA.

- 44 Sea Soundings.
- 45 " 1,750 fathoms; lat. 52.40, long. 15.88.
- 46 " The "Challenger" Expedition, 1,750 fathoms.
- 47 Foraminifera, Mediterranean, 430 fathoms.
- 48 " Group.
- 49 " "
- 50 Alveolina.
- 51 Dendrolina.
- 52 Nodosaria.
- 53 " Arenaceus.

- 54 Nubecularia -cicfuga.
- 55 Orbiculina.
- 56 Peneirples.
- 57 Peneirples.
- 58 Putviallaria menardi.
- 59 Quinqueloculina.
- 60 Diatoms, Selected.
- 61 " Triceratium favis, x 100.

EGGS OF INSECTS.

These are very beautiful Slides price 1s. 6d. each.

- 62 Group of Various Eggs.
- 63 Eggs of Moth.

POLARISED OBJECTS.

- 64 Salicine.
- 65 Citric Acid.
- 66 Oxalic Acid.
- 67 Chlorate of Potash.
- 68 Claw of Wild Cat.
- 69 Toe of White Mouse.
- 70 Satin Spa.

VARIOUS.

- 71 Normal Lungs, x 20.
- 72 Coal Miner's Lungs, x 20.
- 73 Sweep's Lung, x 20.
- 74 Yeast Plant, x 1000.
- 75 Paste Mould, x 70.
- 76 Cotton Fibre, x 125.
- 77 Microcæa Bacillaceæ, x 1000 (Bacilla of Acetic Acid).
- 78 Diamonds, etc., from Canon Diabolo Meteorite, x 85.
- 79 Thames Water at Brentford, x.
- 80 " Hungerford, x.
- 81 " Lambeth, x.
- 82 " Kingston, x.
- 83 Cistern Water, x.
- 84 Sewer Water.

- 85 The Anchor Plates of the Synapta.
- 86 Brown Cassida India Platypria echidna.
- 87 Eels from Vinegar X 55.
- 88 The side view of a Nautilus Shell.
- 89 " " "
- 90 X Ray Photograph of a Shell.
- 91 Bacilli in Milk.
- 92 Cockles and Mussels. The shells open and closed to show hinges.
- 93 Eggs of the Magpie Moth X 10.
- 94 Foot of Leaf-cutter Bee X 12.
- 95 The head of a Water Boatman X 12.
- 96 Foot of a Water Beetle X 10.
- 97 Tongue of the Butterfly X.
- 98 Foot of Blow-fly showing pad X 70.
- 99 Eyes of Spider X 12.
- 100 Prepared salt X 30.
- 101 Foraminifera Deep-sea Soundings. 40 fathoms.
- 102 " " " 110 "
- 103 " " " 155 "
- 104 " " " 200 "
- 105 " " " 257 "
- 106 " " " 1,120 "
- 107 The Hornet.
- 108 Death-watch Beetle. Life History.
- 109 Holes made by Beetle.
- 110 Cut section showing borings.

Nos. 111-120 are all taken at the same magnification X7.

- 111 Bed Bug (*Cimex lectularius* Linnaeus). Mæle.
- 112 " " " Female.
- 113 Flea, Male. ("Pulex irritans.") " Female.
- 114 " Female.
- 115 Head Louse. (Pediculus Capitis.)
- 116 Body Louse. (Pediculus Vestimenti.) Male and Female. Larvae and Egg.
- 117 Crab Louse. Male. (Pediculus.)
- 118 Crab Louse. Female.
- 119 Itch Insect. (Sarcoptes Scabiei. Male and Female. Larvae and egg.
- 120 Chigol Sarcopsyllas, gallinaceous pulex penetrans. Ceylon.
- 121 Dog Flea. (Pulex Canis.)
- 122 Sheep Tick. (Melophagus ovis.)
- 123 Saw Fly. (Tenthredo variata.)
- 124 Crab Louse. Male.
- 125 Harvest Bug.
- 126 Crab Louse.
- 127 Stable Fly.
- 128 Trichopyton tensurens.
- 129 Itch Insect, Male and Female. Larvae.
- 130 Head Louse.
- 131 Chigol Pulex penetrans.
- 132 Head of Flea.
- 133 Head of Flea, Ear organ.
- 134 Body Louse, Male.
- 135 " Female.
- 136 Skin or moult of Bug.
- 137 Eggs of Bed Bug.

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- 34 One-wattled Cassowary.
- 35 Interior of Aquarium.
- 36 Pike.
- 37 Garfish.
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- 39 Freshwater Eel.
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- 42 Dog Fish and Ray.
- 43 Crawfish.
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- 46 Tortoises.
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- 66 Kangaroo Enclosure.
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- 68 Nylghale.
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- 75 Larus Crane.
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- 95 King Crabs.

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- 51 Plan of the Zoological Gardens.
- 52 Crowds at the Zoo.
- 53 Cheetah.
- 54 Polar Bear begging.
- 55 Kangaroos.
- 56 Persian Gazelle.
- 57 Himalayan Bear.
- 58 Axis or Chital Deer.
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- 61 Head of Wapiti Deer.
- 62 Walrus.
- 63 Black Bear.
- 64 Bison.

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- 5 " Head
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- 7 Tiger
- 8 " Bengal
- 9 " at full length
- 10 " Head
- 11 African Elephant
- 12 " " Head
- 13 Indian " with children
- 14 " " with children
- 15 Bear climbing a pole
- 16 Polar Bear (aged)
- 17 Polar Bear (young)
- 18 " coming out of water
- 19 Rhinoceros
- 20 " swimming
- 21 " one-horned
- 22 " two-horned
- 23 Hippopotamus, "Guy Fawkes"
- 24 Camel House
- 25 Camel
- 26 Camel, Bactrian
- 27 Dromedary
- 28 Llama
- 29 " side view
- 30 " Guanaco
- 31 Giraffes
- 32 Kangaroo
- 33 Mac Kangaroo
- 34 Gazelle

- 35 Semmering Gazelle
- 36 Wapiti and Hinds (Young Horns)
- 37 Reindeer
- 38 Moose
- 39 Nylghau
- 40 Mule or black-tailed Deer
- 41 Adder
- 42 Gnu
- 43 Hartbeest
- 44 Malacca Deer
- 45 Zebra
- 46 Zebra "Burchell's"
- 47 " young
- 48 Wild Ass, " Asiatic"
- 49 Goat
- 50 Ibex
- 51 Yak
- 52 Barbary Sheep
- 53 Malay Tapir
- 54 Peccary
- 55 Wolf, Grey
- 56 " Indian
- 57 Black-bearded Jackal
- 58 Fox, Indian
- 59 " Arctic
- 60 Dingo
- 61 Bison
- 62 Eland
- 63 Indian Buffalo
- 64 Zebu (Sacred Ox of India)
- 65 Zebu, male & female
- 66 Gayal, Indian
- 67 Wild White Cattle
- 68 Gibbon Ape

- 69 Chimpanzee
- 70 Orang-Outang
- 71 Nacope
- 72 C'ap'yhara
- 73 Sea Lion
- 74 Seal
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- 76 Porcupine
- 77 Giant Tortoise
- 78 Tortoise Yard
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- 80 Mexican Bull Snake
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- 86 Australian Vulpine
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- 88 West African Black-cheeked Monkey
- 89 Common Badger. Caught at Hampstead
- 90 Brown Bear, Russia
- 91 Spanish Cattle

- 92 Chameleon
- 93 Chimpanzee, "Mickie," West Africa
- 94 Chincilla
- 95 Boa Constrictor
- 96 Crocodile
- 97 Squirrel Dorsal, Central America
- 98 Cape Jumping Hare, South Africa
- 99 Ethiopian Wort Hog, S.E. Africa
- 100 Brown Hyena, Sth. Africa
- 101 Kinkap, S. America
- 102 Leopard, "Major," India
- 103 Arizona Heleiderma (poisonous lizard)
- 104 Marals Deer
- 105 Pata Monkey, W. Africa
- 106 Orang outang, Borneo
- 107 Raccoon, N. America
- 108 Viscacha, Argentina
- 109 Common Wolf, Siberia
- 110 Grevys Zebra, Abyssinia
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- 112 Giraffe presented by Col. Mahon
- 113 The Aard Wolf

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115	Eagle Hawk	130	Cassowary	145	Coudor. Andes
116	" " Tu. ny	131	Craue, t. common	146	Concave Casque
117	" " Bateleur	132	" " Australian		Hornbill
118	" " Great Sea	133	" " Stanley	147	O. rich, S. Africa
119	" " Lesser Sea	134	" " Wattled	148	King Penguin
120	Vulture, Bearded	135	" " Cape Crowned	149	Crowned Pigeon,
121	Ostrich	136	Sacred Ibis, Aus- tralia		New Guinea
122	Rhea	137	Egret	150	Spoonhill
123	Secretary Bird	138	Crested Screamers	151	Blacknecked Stork, Malacca
124	Flamingoes	139	Great Bustard	152	Griffon Vulture, Mo- rocco
125	Stork, Common	140	Upland Geese at Patagonia	153	Cuckoo Hawk
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3	Bear, Polar, and Cubs, Encounter with	21	Reindeer Shooting
4	Bee Hunting in Australia by Natives	22	Beal Spearing in Greenland, from Canoes
5	Bison Hunting by Indians in Snow Shoes	23	" How to Shoot
6	" " dressed in Wolfskins	24	Snake Hunting by Natives of Australia
7	Buffalo Charge in Africa, Escape of Native	25	Tiger Hunting on Elephants in Indian Jungle
8	Elephant <i>carrying</i> Hunter on his Trunk	26	" Death Spring, seizes head of Elephant
9	" protecting Young from Kafir Spear-men	27	" fighting with Gladiator, Coliseum, in Rome
10	" harnessed for War. Indian Battle	28	" and Alligator fighting
11	" driven into Corral by Natives. Night Scene	29	" strikes down Lieut. Rice, shot by Huntsman
12	Hippopotamus Trap, the Downfall of the Spear	30	" shooting by Native, Decoy Goat. Man for Dinner, Goat for Supper
13	Hog Sparing. Indian Officers with Dogs	31	Walrus Spearing from Boats, Greenland
14	Kangaroo Hunt with Dogs in Australia	32	" Battle with King of the Frozen Seas
15	Killing the Panther, saving Huntsman's life	33	Whaling, Whale harpooned
16	Lion Hunting, killed by Elephant with branch of Tree, and Sportsman rescued	34	Wild Horse, Hunting with Lasso, South America
17	Lion attacks Dr. Livingstone, and shot by Native	35	Wolves and Russian Traveller. Noble Sacrifice
18	Lions fighting	36	Wolf Pit for Trapping Wolves, Lamb as Decoy

The following are from the illustrations in the book :

"THE ROMANCE OF THE ANIMAL WORLD."

37 After the Hunt. Group of Hunters round a dead Tipi.	48 A Fight between a Whale and Swordfish. Three versus one.
38 A Wolverine stealing a Gridiron. This is a very mischievous beast.	49 A Wolf pleading for life. Awaiting the Judgment.
39 A Brave Walrus, protecting her young one from the hunter.	50 An Eagle Attacking an Osprey. Highway Robbery.
40 A Kaffir Lion Hunt.	51 Beavers felling a tree.
41 An Alligator and Peccary. An unexpected meal.	52 Spiders as Pets.
42 A Jaguar up a tree attacked by Peccaries. Besieged.	

See also "Sports and Pastimes," Section 9 of this Catalogue.

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| 3 Bull Dog | 13 Dandie Dinmont | 24 Pomeranian Toy | Haired |
| 4 Borzoi—Russian Wolf | 14 Griffon Fee | 25 Persian Greyhound | 35 Irish Terrier |
| Dog | 15 Greyhound | 26 Sheep Dog—Bob Tail | 36 Airedale Terrier |
| 5 Bull Terrier | 16 Italian Greyhound | 27 Spaniel—Water | 37 Terrier—Otter |
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| 8 Chow Chow, Black | 19 Maltese Terrier | 30 Saint Bernard | 40 Dogs' Cemetery, Hyde |
| 9 Chow Pup | 20 Newfoundland | 31 Stag Hounds | Park |
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| 14 Common Seal. | 33 Water Vole. | |
| 15 Ringed Seal and Harp Seal. | 34 Common Hare. | |
| 16 Hooded Seal and Bearded Seal. | 35 Mountain Hare (Autumn) and Irish Hare. | |
| 17 Otter. | 36 Mountain Hare (Winter.) | |
| 18 Badger. | 37 Rabbit. | |
| 19 Pine Marten. | 38 Red Deer. | |

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SOUTH AFRICAN MAMMALS

These Slides are taken from the fine illustrations in "The Natural History of South Africa," published by Messrs. Longmans, Green & Co.

BY I NATURAL HISTORY OF SOUTH AFRICA.

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| 5 A mother Vervet and her baby. | 10 Chacma Baboon. |

MAMMALS—LECTURE I.—Continued.

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| 11 Skull of Chacma Baboon. | 25 A Serval Cat. |
| 12 A youngster of the Baboonfolk eating a banana. | 26 A female Serval Cat. |
| 13 S. African krantz. | 27 An adult Black-footed Cat. |
| 14 Skeleton of a female baboon. | 28 African Wild Cat and her Kittens. |
| 15 Leaves of the prickly pear showing the fruit
which the Baboons feed. | 29 An adult Caracal and Kitten of the same species. |
| 16 Baboon Twins. | FLYING MAMMALS. |
| 17 Yellow Baboon. | 30 A male Epauletted Fruit Bat in the act of flying
off with a fig. |
| 18 A Baboon Warrior's Weapons. | 31 hanging from a branch. |
| 19 Garnett's Galago. | 32 An Epauletted Fruit Bat and its Baby. |
| 20 Moholi Galago. | 33 Yellow Fruit Bat. |
| 21 A Leopard. | 34 Collared Flying Fox with its baby. |
| 22 Leopard at bay in thorny scrub. | 35 Skeleton of a Bat. |
| 23 A Hunting Leopard. | 36 Wing of a Bat. |
| 24 Skull of a Leopard. | |

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| 3 Large Spotted Genet. | 18 A Black-backed Jackal emerging from cover. |
| 4 Small Spotted Genet. | 19 Silver Fox. |
| 5 Small Grey Mongoose attacking a Rhingals Cobra. | 20 Delalande's Fox. |
| 6 Large Grey Mongoose. | 21 Cape Hunting Dog or Wild Hound. |
| 7 Water Mongoose. | 22 Cape Hunting Dog on the watch for a meal. |
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| 11 Banded Mongoose. | 26 Striped Muisbond or Stink Cat and its family of three. |
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| 13 Pair of slender Tailed Meerkats and their young ones. | 28 Cape Sea Lion. |
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| 5 | Pair of Black Wildebeests or White Tailed Gnu. | 25 | Bushbuk. |
| 6 | Blue Wildebeest or Brindled Gnu. | 26 | Inyala, Ram and Ewe. |
| 7 | Cape Duikers. | 27 | Young specimen of Situtunga. |
| 8 | A Pair of Blue Duikers with fawn. | 28 | Young Kudus. |
| 9 | A pair of Klipspringers. | 29 | Hippopotamus. |
| 10 | A Pair of Orihi. | 30 | A hoar Bush Pig. |
| 11 | Steeubok Ram, Ewe and Fawn. | 31 | Wart Hog Boar. |
| 12 | Gryshok, Ewe and Fawn. | 32 | African Buffalo Calf. |
| 13 | Livingstone's Luni. | 33 | Mountain Zebra. |
| 14 | Waterhuck Bull. | 34 | Burchell's Zebra. |
| 15 | A pair of Lechwe. | 35 | White or Square lipped Rhinoceros. |
| 16 | Puku. | 36 | Black or Prehensile lipped Rhinoceros. |
| 17 | Reedhuck, Ram and Ewe. | 37 | Klip Dassie; Rock Rabbit; or Coneys. |
| 18 | Vaal or Grey Rhebok, Ram, Ewe and Fawn. | 38 | Tree Dassie. |
| 19 | Impala or Pallahn, Ram, Ewe and Fawn. | 39 | African Elephant. |
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| 2 | Rock Jumping Shrew. | 12 | Cape Ground Squirrel. |
| 3 | A family of South African Hedgehogs. | 13 | Cape Dormouse. |
| 4 | Musk Shrews searching for insects. | 14 | Large Grey Dormouse. |
| 5 | The Golden Mole. | 15 | Gerbille (Male and female). |
| 6 | The Golden Mole showing its picks and shovels
(fore and hind feet). | 16 | Puff Adder in act of striking a Bush Otomys. |
| 7 | Dentition of an insectivorous animal (Golden
Mole). | 17 | Vlei Otomys. |
| | RODENTS. | 18 | Chestnut Tree Mouse. |
| 8 | Dentition of a typical rodent animal (Porcupine). | 19 | Grey Tree Mouse. |
| 9 | Grey footed Squirrel. | 20 | Brown or Norway Rat. |
| | | 21 | White Nosed Rat. |
| | | 22 | Pouched Rat. |

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| 23 Striped Rat.
24 Cape Blesmol.
25 Sand Mole.
26 Mole Rat and Darling's Blesmol.
27 Mounds or Hills cast up by the Blesmol.
28 Springhare or Springhaas.
29 Rock Rat.
30 Cane Rat.
31 South African Porcupine.
32 (1) A white hollow gull from the tail of Porcupine.
(2) Portion of a body quill showing the sharp end.
(3) The same, showing the end which is loosely embedded in the skin. | 33 Tail of a Porcupine.
34 Cape Hare.
35 South African Hare.
36 Red Hare.
37 Rock Hare.
38 School of Sperm Whales.
39 Hump Back Whale.
40 Hump Back Whale, showing baleen or whale bone in mouth.
41 Sowerby's Beaked Whale.
42 Elephant Seals.
43 Aard Vark approaching a Termite Hill.
44 Scaly Ant-Eater or Pangolin. |
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3 Raft and Natives of King's Sound, Western Australia.
4 Ditto.
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8 Festal dance or "Corroboree" of Kimberley, Western Australia Natives.
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10 Echidna or Spiny Ant-eater, Tasmanian variety, <i>Echidna setosa</i> .
11 Short-headed Flying Phalanger, <i>Petaurus brevicaeps</i> , showing position maintained during its characteristic flying leap.
12 White Individual of Large Flying Phalanger, <i>Petaurides volans</i> , with tail pendulous.
13 White Individual of Large Flying Phalanger, (<i>Petaurides volans</i>), with tail in its characteristic spirally enrolled state.
14 Australian Bear or Koala with cub. <i>Phascolarctos cinereus</i> .
15 " " " in tree.
16 " " " asleep.
17 Flying Phalanger, <i>Petaurides volans</i> .
18 Australian Pouched Mole, <i>Notoryctes typhlops</i> , ventral and lateral aspects.
19 Min-r's tent, and nest mount of Australian Jungle Fowl, <i>Argopodium tennellus</i> , Goode Island, Torres Straits.
20 Baobab or Bottle Tree, <i>Adansonia digitata</i> , N.W. Australia.
21 Hollow wooden cradle used by the native women of the Kimberley District, Western Australia. | 24 Australian "More-porks," or fern owl, <i>Podargus strigoides</i> , illustrating remarkable disparity in size and aspect of Podargi under contrasting emotional influences.
25 Australian "More-pork" (male bird). <i>Podargus strigoides</i> .
Australian "More-porks," illustrating Protean aspects assumed under varying emotional influences:—
26 Counting their Chickens.
27 Sportive excitement.
28 Calm repose.
29 Youthful innocence.
30 Terror and defiance combined.
31 Mimetic concealment.
32 Attenuated attitudes in imitation of the branches on which they sit.
33 In the Land of Nod—Fast asleep.
34 Australian More-pork nest building extraordinary.
35 Gondian Finches dancing. (1) Introductory salutations. (2) <i>The Pas de Deux</i> .
36 North Queensland Laughing Jackass, <i>Dacelo leucotis</i> .
37 "Innocents Abroad," Young Australian Pelicans, <i>Pelecanus conspicillatus</i> .
38 Young Australian Osprey. <i>Pandion leucocephalus</i> . |
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- | |
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40 " " at rest.
41 Frilled lizard, <i>Chlamydosaurus Kingi</i> .
42 Bipedal running phase; from instantaneous photographs.
43 Ditto.
44 Ditto.
45 Ditto.
46 Ditto.
47 Ditto.
48 Frilled lizards asleep.
49 Prototype of Chinese dragon.
50 Bearded lizard, <i>Anphibolurus barbatus</i> .
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| 22 "Dulce Domum"
23 Australian "More-porks" or fern owls. <i>Podargus strigoides</i> . |
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- 156 Dwarf oysters, *Ostrea ordensis*, Ord River, Western Australia
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The following Slides, beautifully painted, are copied from the coloured plates in book, 10s. each.

- 189 Tidally-exposed inshore reef, Palm Island, Queensland
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BZ

VETERINARY SCIENCE.

Slides selected and arranged by James Brodie Gresswell, F.R.C.V.S., Lecturer on Veterinary Science for the Lindsey and the Hollands County Councils of Lincolnshire; co author of "Equine Medicine"; author of "Veterinary Pharmacology and Therapeutics," etc., etc.

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- 1 The Skeleton of the Horse
- 2 " " Cow
- 3 " " Sheep
- 4 " " Dog
- 5 " " Pig
- 6 Lateral view of the Horse Skull
- 7 Right fore-foot of a Horse
- 8 Left hind-foot of the Horse, External aspect
- 9 External Muscles of the right anterior limb of the Horse
- 10 The Larynx of the Horse, Cartilaginous pieces maintained in their natural position by the articular Ligaments, Superior and Inferior Faces
- 11 The Bronchial Tube of the Horse with its Branchules and ultimate ramifications
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77 Bones of Fore-legs.
78 Over-reach.
79 Mallender.
80 Spallender.
81 Spavin and Spavin from outside.
82 Curb.
83 Capped Hocks.
84 Quittor.
85 Yorkshire Boot in course of fixing and complete.
86 Hoof prepared for Charlie shoe.
87 Laminitis-pointing.
88 Seedy Toe.
89 Lacing. | 90 Bog-spavin.
91 Thoroughpin.
92 Splint and Splint from outside.
93 Knuckling over.
94 Side bone and side bone from outside.
95 Sand Crack.
96 A Cankered Foot.
97 Wind-galls.
98 Brushing.
99 Disb'ng.
100 Calf Knees.
101 Forging.
102 Ring bone and Ring bone big from outside. |
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BY DISEASES AND PARASITES OF CATTLE.

Many from original drawings by the late Professor Allen Harker, F.L.S.

Plain Photographs, 2s. each.

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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Warbles in Ox, <i>Hypoderma bovis</i> , female, Larva from tumour. Genital apparatus, eggs, &c.
2 Dot in the Horse, <i>Gastrophilus equi</i> , Boas attached to stomach, eggs on hairs, and adult Fly
3 Mange in the Horse, <i>Psoroptes communis equi</i> , male
4 Mange in the Horse, male and female
5 Mange in the Dog, <i>Demodex folliculorum</i>
6 Itch in Man, <i>Sarcoptes scabiei</i> , male and female
7 Scab in Sheep, <i>Psoroptes longirostris var ovis</i>
8 Lice of Pig
9 " of Horse
10 (sucking) of Ox, <i>Hematopinus eurylegus</i>
11 (biting), <i>Trichofectes scalaris</i> , with allied form from Magpie for comparison
12 Tick from Sheep, <i>Ixodes ricinus</i>
13 Tick from Dog, <i>Ixodes ricinus</i>
14 " or Ked from Sheep, <i>Melophagus ovinus</i> | 15 Brain of Sheep with polyccephalous Hydatid of <i>Tenia caninus</i>
16 A Tape Worm of Dog, <i>Tenia marginata</i> , in Bladder Cyst from Sheep
17 Tape Worm of Dog, <i>Tenia marginata</i>
18 <i>Trichina spiralis</i> a piece of infested flesh
19 Liver Fluke of Sheep, <i>Distomum hepaticum</i>
20 The Snail, the Fluke inhabits, <i>Limnaea truncatula</i> and embryo of <i>D. hepaticum</i>
21 Autumn Breeze Fly, <i>Tabanus bovis</i> , magnified head and mouth organs
22 Common Symbiot, <i>Symbiotes communis</i> , found on Horse, Ox, Goat, Sheep, and Rabbit
23 Tape Worm of a dog Detail
24 Egg of Liver Egg of Fluke, etc
25 Fully developed Redia
26 Section of Sheep's head |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

FARM LIVE STOCK.

Beautifully Painted, 6s.; Plain Photographs, 2s. each.

This Series has been arranged by J. H. Dugdale, Esq., of Warwickshire, with the kind co-operation of Professor Wallace, of Edinburgh, and of several eminent Breeders, who have kindly permitted the use of their photographs of Stock.

Text Book, "Farm Live Stock of Great Britain," by Robert Wallace, F.L.S., F.R.S.E., &c., Prof. of Agricultural and Rural Economy in the University of Edinburgh.

Published by Messrs. Crosby Lockwood & Sons, 7, Stationers' Hall Court, price 50s.

BU**HORSES.**

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Cleveland Bay Horse "Fidius Deus," R. F. Webster, Esq.
2 Clydesdale Stallion "Prince of Carruchan," Peter Crawford, Esq.
3 " " "Darnley," David Riddell, Esq.
4 " " "Prince of Wales," 673
5 " " "Prince of Albion," 6178
6 " Mare, "Moss Rose," John Gilmore, Esq.
7 Coaching Stallion, "Salisbury," Thos. Carr, Esq.
8 " Mare, "Wasall Belle," T. B. Church.
9 Hackney or Norfolk Trotter in harness [Esq.]
10 Shire Stallion, "Spark," The Duke of Westminster
11 " " "Hitchin C.queror," A. B. Freeman Milford, Esq., C.B., M.P.
12 " " "Staunton Hero," W. Gilbey, Esq. | 13 Shire Mare, "Chance," A. B. Freeman Milford, Esq.
14 " " "Lockington Beauty" and Foal
15 "Merville," A. B. Freeman Milford, C.B., M.P.
16 Suetland Pony Stallion, "Laird of Noss," 20, The Marquis of Londonderry
17 Suffolk Punch Stallion, "Wedgwood," A. J. Smith, Esq.
18 Suffolk Punch Mare, "Queen of Trumps," 270
19 Poitou Mule, "Beauty," 17 bands, P. C. Sutherland, Esq.
20 Jack Donkey, "Malta Jack," C. L. Sutherland, Esq.
21 Trotting Horse (American), "Allerton" 2-12
22 " Mare "Sunol" 2-5
23 Thoroughbred Horse, "Foxhall"
24 A Hayfield in Gloucestershire
25 "Simon Dale," Luke of Portland |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
-
- | | |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| 25 Cleveland Bay "Baron O'Buchlyvie"
26 Clydesdale Horse "Dunure Kaleidoscope"
27 " " "Victor Dale"
28 " " | 29 Clydesdale Horse. "Ardendale"
30 " " "Gallant Stewart"
31 " " "Dunure Realisation" |
|---------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|

FARM LIVE STOCK—HORSES—continued

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|----|------------------------|----------------------|
| 32 | Clydesdale Horse. | |
| 33 | " | |
| 34 | " Mare | " Dunure Myrene " |
| 35 | " Filly | |
| 36 | " Colt | " Passchendale " |
| 37 | " Horse | " Dunure Footprint " |
| 38 | " Eaton Fenland King " | |
| 39 | Hackney Horse | |

- 40 Hunter thoroughbred Mare
41 Suffolk Punch Stallion "Morston Old Guard"
42 " Horse
43 " Shire Horse "Tatton Wray King"
44 Welsh Pony
45 " "
46 A Thoroughbred-Race-horse "Papyrus"
47 Thoroughbred Race-horses in action

BV

- 1 Black-faced Sooth Mountain Ram, "Cleece-
cester's Grandson," *Charles Hovattson, Esq.*
- 2 Black-faced Scotch Ram "Potiphar," *Archibald,*
- 3 Black-faced Scotch Ewes, *Joka Craig, Esq.* [*Esq.*]
- 4 Border Leicester Ewes
- 5 "Lambus"
- 6 Cheviot Ram "J. A. Johnstone, Esq."
- 7 "Aimful Sandy" (East County
Variety), *Joka Elliot, Esq.*
- 8 Cheviot Ewe (West County Variety), *J. A. John-
stone, Esq.*
- 9 Cotswold Ram, *Russell Snowditch, Esq.*
- 10 "Ewe (Two-shear), *Russell Stanwick Esq.*
- 12 Devon Long-wool two-shear Ram, *Sir J. H. H.
Amory, Bart.*
- 14 Devon Long-wool Ewes, *Sir J. H. H. Amory, Bart*
- 15 Dorset Horned Flock, *J. Davis, Esq.*
- 17 Exmoor Ram, *Sir Wm. B. Williams, Bart.*

- SHEEP.

- 18 Exmoor Ewe, Sir Wm. R. Williams, Bart.
- 19 Hampshire Down Ram, Robert Coles, Esq.
- 20 " " Rams, College of Agriculture,
Downton
- 21 Herdwick Ram, "Disraeli" and Ewes
- 22 " Sheep
- 23 Kent or Romney Marsh Ram. in full fleece, H.
Page, Esq.
- 24 Leicester Ram, T. H. Hutchinson, Esq.
- 25 " Ewes, " "
- 26 Leicester Sheep in Wool
- 27 Lincoln Sheep in Wool, H. Dudding, Esq.
- 28 " Rams
- 29 " Ewe, Robert Wright, Esq.
- 30 " Ewe with Lambs
- 31 Lonk Ram (Two-shear), "Captain," Mrs. Dawson
- 32 " Ewes (Two-shear), Mrs. Dawson
- 33 Merino Rams (Two young, Pure Stud)

- 35 Merino and Scottish Black-faced Mountain
Crosses
36 Oxford Down Rams, *C. Hobbs, Esq.*
37 " " Ram, + Liverpool Freeland," *John
Treadwell, Esq.*
38 Oxford Down Ewe
39 Rosecommon Ram, *Richard Flynn, Esq.*
40 Ryeland Ram *Frank Shepherd, Esq.*
41 Shropshire Ram, "Webton Prince," *Edward
Caddick, Esq.*
42 Shropshire Ewes, *Edward Caddick, Esq.*

- 43 Somerset and Dorset Horned Sheep
44 Southdown Ram, "No. 24"
45 Suffolk Ram, "Sailor Prince," Edward Giffus, Esq.
46 Ewes, Joseph Smith, Esq.
47 Welsh Mountain Ram
48 " Ram and Ewe
49 Wensleydale Ewe
50 " Ram (Shearling)
51 Wey Shearing Machine at Work in Wool
52 Shed
53 Shearing Scotch Black-faced Mountain Sheep.

- | | | |
|----|------------------------|-----------------------|
| 53 | Border Leicester Sheep | |
| 54 | " " | " Royal Wallace " |
| 55 | " " | " His Majesty " |
| 56 | Cheviot Sheep | Three specimens |
| 57 | " " | Group |
| 58 | " " | Shearing, the old way |
| 59 | Corriedale Wool | |
| 60 | Dorset Horn | |
| 61 | English Leicester | Royal Winner |
| 62 | " " | Prize Sheep |
| 63 | Gatton Park Flock | |
| 64 | Lincoln Sheep | |
| 65 | Merino Ram | |
| 66 | Romney Marsh | World's Champion Ram |
| 67 | " " | Group |

- | | | | | | |
|----|----------------------------------------------------|---|---|---|---|
| 68 | Romney Marsh, Single | | | | |
| 69 | " " Westbrook | | | | |
| 70 | Suffolk Ewe " with their 150 Lambs | | | | |
| 71 | Suffolk Ram | | | | |
| 72 | " " Carcase | | | | |
| 73 | Southdown, " Nottingham Champion | | | | |
| 74 | " " Sir Jeremiah Colman's | | | | |
| 75 | " " Group | | | | |
| 76 | Three Shropshire Rams | | | | |
| 77 | Shropshire Down | | | | |
| 78 | Sheep Cross Breeding | | | | |
| 79 | Group of Suffolk Ewes in full fleece. 17 mths. old | | | | |
| 80 | Typical | " | " | " | " |
| 81 | Foraging | " | " | " | " |

B W

- 1 Anglesen or North Wales Black Bull, *Major Sandbach*
- 2 Anglesen or North Wales Black Cow, *Col. Platt*
- 3 Ayrshire Bull (Cook a Bendie) *J. Osborne, Esq.*
- 4 "Craigs of Kyle"
- 5 "Cow," *Bertie H. of Clockston, Sir Mark J. Stewart, M.P.*
- 6 Ayrshire Heifer, "Nellie of Barcheskie"
- 7 Castle Martin of South Wales Black Bull "Zulu," *H.B. 129, Earl of Cawdor*
- 8 Castle Martin or South Wales Black Cow "Lynora I.," *H.B. 245, Earl of Cawdor*
- 9 Castle Martin or South Wales White Bull with Black Points
- 10 Dexter Kerry Bull, "Paradox," *Martin J. Sutton, Esq.*
- 11 Dexter Kerry Cow "Rosemary," *Martin J. Sutton, Esq.*
- 12 Galloway Bull. "Camp Follower" (5042) *James*

CATTLE.

- 13 Galloway Heifer, "Tidy 5th of Drumlanrig,"
Leonard Pirie agent, Esq
- 14 Glamorgan Bull J. T. Dav & Co, Esq.
- 15 Guernsey Bull, "Chimax," The Express Dairy
Company. E.G H.B. 14.
- 16 Guernsey Cow, "Ladybird II.," Express Dairy
Company. H.B. 388
- 17 Hereford Bull, "Rare Sovereign," Lord Coventry
- 18 " Heifer "Primrose," Edward Caddick Esq.
- 19 Hereford Cow "Ma Belle," Her Majesty the Queen
- 20 Jersey Bull "Dissections Pride," Jas Bloth, Esq.
- 21 " Cow, "Pontorson," Lord Rothschild
- 22 " Cow, A. E. McNallen, Esq.
- 23 Kerry Bull, "Paddy Blake," Lord Clonmell
- 24 " Cow, "Flora," Martin J. Sulton, Esq.
- 25 Longhorn Bull, Duke of Buckingham
- 26 " Cow, Duke of Buckingham
- 27 Norfolk and Suffolk Red Poll Bull, "Diddlington
Davison II." Lord Amherst

FARM LIVE STOCK—(Continued.)

- 28 Norfolk and Suffolk Red Poll Cow, "Emblem
Lord Amherst
- 29 Norfolk and Suffolk Red Poll Cow, J. J. Colman
Esq., M.P.
- 30 Norfolk White Polled Cow, "Blickling Jenny"
"Tom"
- 32 North Devon Bull, "Lord Wolsley," H.B. 2063,
Lord Falmouth
- 33 North Devon Heifer, "Flower II," H.B., 9335,
Sir W. Williams
- 34 North Devon Cow, "Fairmaid," 9337, D.D., H.B.
Sir W. R. Williams, Bart.
- 35 Polled Aberdeen Angus Cow, "Waterside Matilda
II," George Wilkes, Esq. H.B. 5312
- 36 Polled Aberdeen Angus Bull, "Cash"
- 37 Shorthorn Bull (Bates), Cow, "Duchess of Leic-
ester II."
- 38 " " (Scottish) Bull, "Mario"
- 39 " " "Barrington," Duke of North-
umberland.
- 40 Shorthorn Cow
- 41 " Heifer, "Fairy Rosebud"
- 42 " " "Bracelet"
- 43 Shetland Cattle.
- 44 Sussex Cow, "Elsa."
- 45 Sussex Ox, W. S. Forster, Esq.
- 46 " Bull, "Gondolier," W. S. Forster, Esq.
- 47 West Highland Bull, "Seumas A'Ghlinne," H.B.
482, Earl of Southesk.
- 48 West Highland Heifer, "Lady Flora," Earl of
Southesk.
- 49 White Polled Cattle, Somerford Park, Sir C. W.
Shakerley, Bart., C.B.
- 50 Wild White Cattle, Cadzow Forest, Hamilton
- 51 " " "Charley Park
- 52 " " "Vaynal Park, Bangor "
- 53 Skull and Horn Cores of the Bos urus or Primi-
genius—width below horns, 12 in.; length of
horn cores, 27 in.
- 54 Ayrshire Cow "Spindel Bank Winnie."
- 55 " " "Tors Missal."
- 56 " Bull, "Chapelhill Fearnought."
- 57 " " "Rising star."
- 58 " " "Look Alive."
- 59 " " "Nether Craig."
- 60 Champion Milking Cow. "Jehanna Tehu."
- 61 Devon Steer.
- 62 " " Fat. 19½ cwt.
- 63 " Bull.
- 64 " Old and New Type.
- 65 Dairy Shorthorn.
- 66 Dexter Kerry Cow. "La Mancha."
- 67 Hereford Bull. "Roh Roy."
- 68 Hodges Bull. "Fokke 2nd."
- 69 Highland Cow. "Madam Luna" with calf.
- 70 Holstein Cow. "Waltham Plum."
- 71 " " "Garton Comfort."
- 72 " " "Betsey Grey."
- 73 " " "Colton Princess Mary."
- 74 " " "Fokke II."
- 75 " " "Froakie III."
- 76 " " "Park Buttercup."
- 77 Holstein "Shewing Udder from rear."
- 78 Irish Dairy Shorthorn.
- 79
- 80 Jersey Bull "Inspector."
- 81 " Cow.
- 82 " Cattle.
- 83 Kerry Cow. "Walton Bashful."
- 84 Shorthorn Bull. "Thornby Don."
- 85 " Cow. "Countess of Heggle 2nd "
- 86 " " "Hero Fancy"
- 87 " " "Playful Marigold "
- 88
- 89 "Lady Florence II."
- 90 "Ormerod Butterfly Prince."
- 91 Two year old Steer. "Pan of the Burn."
- 92 Three year old Cow. "Euroto."
- 93 " Bull. "Prince Blue Blood of
"Ballindalloch."
- 94 Two year old Heifer. "Benton Bride."
- 95 " Monkhill Butterfly."
- 96 " One Royal "
- 97 " Oyster Princess."
- 98 " Oyster Queer."
- 99 " Resolute."
- 100 Bull calf "Ewyford Ringer."
- 101 Ringer sold for £9,450.
- 102 Heredity—Cow Testing Irish Department

For Slides on "Tanning," see Industries, Section 7 of this Catalogue.

B X

PIGS.

- 1 Berkshire Boar, J. H. Dugdale, Esq.
- 2 " Sow.
- 3 Yorkshire Boar (large white) "Holywell Windsor"
- 4 " " (middle white), "Holywell Billy"
- 5 Yorkshire Sow (small white), Saunders Spencer,
6 Suffolk, or small black Pigs [Esq.]
- 7 Tamworth Pigs
- 8 Price Pigs for Bacon purposes
- 9 Berkshire Boar.
- 10 Large Black or Devon Sow.
- 11 Large Black Boar.
- 12 Large White Pig.
- 13 Middle White or Yorkshire Pig.

B Y T

OUR FARMYARD FRIENDS.

From Negatives by DOUGLAS ENGLISH, B.A., F.R.P.S.,
This series has been specially taken by Captain ENGLISH for lecture purposes in
connection with his two recent books, "Our Farmyard Friends," published by Bell, and
"Friends of Mankind," a more advanced book, published by Duttons of New York. They
are therefore illustrative of the "habits" of our familiar farm animals and birds, rather
than of their "points."

Coloured Slides, 6s. 6d. Plain Slides, 2s. 6d. each.

PIGS.

POULTRY.

- 1 Large Black Sow, full face, showing nose-ring.
- 2 Litter of young pigs, showing the wealding.
- 3 Sow looking over gate of sty. Front.
- 4 " " " " Side.
- 5 Young pigs playing with pig-pail.
- 6 Young pig squealing under gate.
- 7 Sow snarling.
- 8 Sow and gander.
- 9 Young Piglings and gander.
- 10 Sow and family on the road.
- 11 Terrier barking at Sow and family.
- 12 " " sitting with same.
- 13 " " with young pigs.
- 14 Sow and family at grass.
- 19 Turkeys preening their feathers.
- 20 Turkey Cock feeding.
- 21 " " gobbling.
- 22 " " displaying. Tail-spread.
- 23 " " head and Neck. Close-up.
- 24 " " and Cock flapping its wings.
- 25 " " and Guinea Fowl.
- 26 Guinea Fowl. Side.
- 27 " " on window ledge.
- 28 Procession of Guinea Fowls.
- 29 Cock crowing. Front.
- 30 " " Side.
- 31 " " Three-quarter.
- 32 Hen taking sand-bath.

OUR FARMYARD FRIENDS—(Continued.)

- 33 Hen drinking.
- 34 " and Chicks.
- 35 Chickens scurrying.
- 36 Foster Mother Hen with ducklings afloat.
- 37 " " " ashore.
- 38 A Meditative Fowl.
- 45 Girl nursing pet duck.
- 46 Duck and Drake out walking.
- 47 Duck quacking.
- 48 Group of Ducks on water.
- 49 Duck flapping wings.
- 50 Ducks in procession.
- 51 Ducks resting in farmyard.
- 52 Geese scurrying to water.
- 53 " on river bank.
- 54 " swimming in river.
- 55 " and goslings swimming.
- 56 Goose flapping wings.
- 57 " issuing at terrier from nest-box.
- 58 Geese driving off terrier.
- 59 " entering pond.
- 60 " hissing at terrier.
- 61 Gander at the pig-trough.

"CATTLE"—HORSES AND DONKEYS.

- 66 Cow nibbling its companion's ear.
- 67 Calf scratching its neck with its foot.
- 68 Pair of White Heifers in show.
- 69 Group of Short Horns.
- 70 Kerries waiting to be milked.
- 71 Short Horn going into milking shed.
- 72 White Heifer browsing on hedge-row.
- 73 Cows leaving farmyard.
- 74 " in the byre.
- 75
- 76 Cart Horse rising from the ground.
- 77 Horse lying on the ground.
- 78 Cart Horse and Foal. Front.
- 79 " " " Side.
- 80 Horse and Donkey.
- 81 Horses returning from water.
- 82 Horses waiting to be stabled.
- 83 Foal rolling.
- 84 Donkey's head. Close-up.

SHEEP AND GOATS.

- 96 Sheep washing.
- 97 " Shearing by hand.
- 98 A Lamb gone astray.
- 99 Bottle Lamb and Terrier.
- 90 Sheep and Terrier.

- 91 Ewe and Twin Lambs.
- 92 Lamb butting stone.
- 93 The lost Lamb.
- 94 Pair of Lambs (horned breed).
- 95 Sheep on Sussex Downs.
- 96 Shepherd watching Sheep.
- 97 Sheep Dog behind flock on road.
- 98 Shepherd leading sheep to food trough.
- 99
- 100 Lambs playing.
- 101 Lambs in snow.
- 102 Sheep with Lambs in snow.
- 103 A herd of goats.
- 104 Goat shaking hands with his mistress.
- 105 Kids resting.
- 106 Kids butting each other.
- 107 Kid jumping.
- 107a Goat and Kids.

CATS AND DOGS.

- 108 Kitten in work-basket. Front.
- 109 " " " " Three-quarter.
- 110 Kittens under Haystack.
- 111 Manx Cat. Tail-less.
- 112 Manx Cat, showing length of hind leg.
- 113 Kitten Race.
- 114 Kittens playing.
- 115 Group of four Kittens.
- 116 Kitten on stair-case.
- 117 Kitten looking up.
- 118 Kitten climbing tree.
- 119 Kittens under tree.
- 120 Cat taking Kittens for walk.
- 121 Kittens and bob-tailed Sheep-dog.
- 122 " " " " " Kitten stretching itself.
- 123 A Stray Cat.
- 124 The White Cat.
- 125 Cat carrying Kitten.
- 126 Cat and Dog playing.
- 127 Kittens playing with scraper.
- 127a Kittens and toad.
- 128 A twenty year old Cat.
- 129 Head of Persian Cat.
- 130 The Watch Dog.
- 131 Head of Bull Dog.
- 132 Terrier Pup.
- 133 A Terrier Family.
- 134 Farm Dog watching gate.
- 135 St. Bernard Dog.
- 136 Bob-tailed Sheep Dog gnawing bone.

R M LIVE STOCK FROM THE ROYAL FARMS AT WINDSOR.

The following Slides of Pedigree Cattle are all made from negatives taken at the Royal Farms at Windsor.

Beautifully Painted 6s.; Plain Slides, 2s. each.

- 1 Devon Steer.
- 2 Devonshire Heifer.
- 3 Devon Heifer.
- 4 Shorthorn Hereford Steer.
- 5 Young Hereford Bull.
- 6 Hereford Bull.
- 7 Hereford Steer.
- 8 Shorthorn Hereford Steer.
- 9 Hereford Bullock.
- 10 Hereford Co.
- 11 Lincoln Red Shorthorn Steer.
- 12 Young Sussex Bull.
- 13 Young Sussex Bull.
- 14 Black North Wales Bull.
- 15 Black North Wales Steer.
- 16 Welsh White Bullock.
- 17 Shorthorn Bull.
- 18 Shorthorn Heifer.
- 19 Shorthorn Bull.
- 20 Shorthorn Steer.
- 21 Shorthorn Bullock.
- 22 Shorthorn Heifer.
- 23 Longhorn Bull.
- 24 Shorthorn Heifer.
- 25 Large Horned Goat.
- 26 Asiatic Ass and Foal.
- 27 Asiatic Ass and Shetland Ponies with Foals.
- 28 Shetland Pony with Foal.
- 29 Shetland Pony with Foal.
- 30 Berkshire Sow and Pigs.
- 31 Berkshire Sow.
- 32 Three Black Essex Pigs.

B T SCENES IN AND AROUND A TYPICAL FARM.*Beautifully Painted 5s. 6d and 6s. each; Plain Slides, 2s. each, except where otherwise marked.*

- | | |
|----------------------------------------------------------------|-----------------------------------------------|
| 1 A typical Farm and Building. | 32 Bullock harrowing. |
| 2 A typical Farm, showing House. | 33 Horses, two, ploughing. |
| 3 The Farmyard. Cattle returning. | 34 Horse and Ox ploughing. |
| 4 Hen and Ducklings in water. | 35 In 'he Stack yard. |
| 5 Geese. | 36 Field Mouse, nest and young. 2s. 6d. |
| 6 Collie dog. "On guard." | 37 Fox Terrier and Rat. |
| 7 Cat and Kittens. | 38 Skye Terrier and Hedgehog. |
| 8 Fox Terrier and Cat. | 39 Fox Terrier. |
| 9 Farm Horse and Cart. | 40 Three Scots Terriers. |
| 10 Mare and Foal. | 41 Retriever. Head Study. 2s. 6d. |
| 11 Shire Mare. | 42 Setters and Pointers. |
| 12 Horse's Head. (Saddle). | 43 The Sleeping Beauty. (Bull Dog). |
| 13 Horse's Head. (Draught). | 44 St. Bernard Dog. |
| 14 Horse's Head. A study looking out of stable. 2s. 6d. | 45 Dogs, young Lupetti. 2s. 6d. |
| 15 Three Mares and Foal. | 46 Two Deerhounds. |
| 16 Watering Horses. | 47 Four Esquimaux Pups. |
| 17 Washing Car's. | 48 Three Greyhounds. |
| 18 Donkey and Foal. | 49 Mastiff. |
| 19 Shetland Ponies. | 50 Pug Dog. |
| 20 Sheep and Lambs. | 51 Bull Terrier. |
| 21 Ewe and two Lambs. | 52 Dachshund. |
| 22 Sheep and Lambs by the stream. | 53 Retriever drinking at Fountain with child. |
| 23 "Mary had a little lamb." | 54 Stag and two Hinds. |
| 24 Cattle chewing the cud. | 55 Wild Fox leaving fox earth. 2s. 6d. |
| 25 Maid milking a Cow. | 56 Fox at Rabbit Hole. |
| 26 A Dairy Cow. | 57 Rabbits, young. 2s. 6d. |
| 27 Shorthorn Bull. | 58 "The Hoy Express." (Bullock Cart). |
| 28 Shorthorn Heifer. | 59 Trapping Birds in Winter |
| 29 Farmyard Friends. Highland Bull with child on back. | 60 At the Smithy. |
| 30 Berkshire Boar. | 61 "The Meet." 2s. 6d. |
| 31 Pigs, young and mother. A Study in Black and White. 2s. 6d. | 62 The Hounds at the Kennel. 2s. 6d. |
| | 63 The Hounds out for exercise. 2s. 6d. |

A O E COUNTRY LIFE AND AGRICULTURAL SCENES.*Beautifully Painted 6s.; Plain Slides, 2s. each.*

- | | |
|-------------------------------------------------------|----------------------------------------------|
| 1 Ploughing, with three horses. | 23 A Typical Country Inn. |
| 2 Haymaking, Cutting the grass with Horse Mower. | 24 A Shoebing Forge. |
| 3 " Tossing into Haycock. | 25 A Field of Waving Corn. |
| 4 " A Horse Haymaker. | 26 A Reaping Machine at Work. |
| 5 " Trimming up ready for carting. | 27 Milking Time. |
| 6 " Loading. | 28 A Kentish Hop-garden, general view. |
| 7 " Raking by Horse Machine. | 29 A Kentish Hop-garden in Cranbrook. |
| 8 " Stacking the hay by elevator. | 30 A Cattle Drinking. A typical River Scene. |
| 9 " A Rick Yard. | 31 A Donkey Ride. |
| 10 Reaping Corn with Scythe. | 32 Nest box in Tree. |
| 11 Reaping with sickles, and binding by hand. | 33 A Rookery in a Public Park. |
| 12 Reaping with a Self-binding Machine. | 34 A Pound. |
| 13 A Field of Wheat, Stacked. | 35 A Stack of Wheat. |
| 13a A Stack of Wheat. | 36 Apple Tree in Blossom. |
| 14 Building a Hay-stack by an elevator. | 37 A Row of Poplars. |
| 15 Building a Hay-stack, by an elevator, nearer view. | 38 An Oak Tree in Winter. |
| 16 A Sprig of Oak, with Oak-apples. | 39 Elm Tree in Winter. |
| 17 Mistletoe growing on a tree-trunk. | 40 Elm Tree in Summer. |
| 18 Sheep-shearing, Washing wool in trough. | 41 Chestnut Tree in Winter. |
| 19 Sheep-shearing (I.). | 42 Chestnut Tree in Bloom. |
| 20 Sheep-shearing (II.). | 43 Sweet Chestnut. Bud and Leaf. |
| 21 A Business Street in a Country Village. | 44 " " " " " showing four |
| 22 A Market in a Country Village. | 45 " " " " " stages of open- |

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| 1 Shorthorn Bull | 12 Ayrshire Cow | 23 Southdown Shearling Ewe |
| 2 " Cow | 13 Jersey Bull | 24 Shropshire Two Shear Ram |
| 3 Hereford Bull | 14 " Cow | 25 Hampshire Down Two Shear Ram |
| 4 Devon Cow | 15 Guernsey Cow | 26 Suffolk Shearling Ewe |
| 5 Sussex Bull | 16 Kerry Cow | 27 Orvisot Ram |
| 6 Welsh Bull | 17 Dexter Kerry Bull | 28 Black-face d Mountain Ewe |
| 7 Longhorn Cow | 18 Leicester Two-shear Ram | 29 Large White Sow |
| 8 Red Polled Bull | 19 Border Leicester Ram | 30 Small " " |
| 9 Aberdeen-Angus Bull | 20 Cotswold Ram | 31 Berkshire Boar |
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- 15 Portable Steam Engine
- 16 Enclosed Gear Mower
- 17 Self-Raking Reaper, the Indestructible
- 18 Hornsby Steel Binder, view from side
- 19 " " " behind [seen]
- 20 Threshing Machine, Clayton & Shuttleworth Right
- 21 " " " Left side
- 22 Threshing Machine, Section to show internal arrangements
- 23 Threshing Machine, Clayton & Shuttleworth, No. 1
- 24 " " "
- 25 Mowing Machine drawn by three horses, self-binder

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- 60 Three-row Ridger at work in South Lincolnshire. (Showing body.)
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- 64 "Dauntless No. 2" 9 tine Self-lift Tractor Cultivator.
- 65 Three-Furrow R.S.L.M.—Y.L. Tractor Plough working with a Weeks Tractor.
- 66 Stand, Royal Show, Derby, 1921.
- 67 Three Row Potato Coverer with pole and whips.
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- 2 A fresh laid egg showing air space at broad end, which expands during incubation and through which chicken pushes its beak before hatching, also supplying the air necessary to life of chicken and providing room for movements during hatching process
- 3 A fresh laid egg carefully opened, showing circular germ which develops into the chicken, the membrane of yolk in folds to allow of expansion. This germ is always nearest the hen when sitting in whatever position egg be placed
- 4 Fresh laid egg opened and yolk turned upside down in the white to show the twisted ends of yolk membrane which by their weight keep the germ uppermost
- 5 Showing appearance of germ after 12 hours incubation, concentric circles appearing
- 6 Germ after 24 hours incubation. The dark patch being a portion non-actinic to plate probably due to first formation of blood taking place
- 7 Appearance after two days—yolk expanding, first appearance of blood vessels, embryo of chicken appearing
- 8 Appearance on 3rd day—rapid development of blood vessels, yolk becoming granular in appearance, embryo of chicken larger and when shell open pulsation of heart visible
- 9 Appearance on 4th day—yolk larger, blood vessels spreading over its surface
- 10 Showing effect of raising the temperature of incubator from 103 degrees (normal) to 120 degrees for 10 hours on 4th day, yolk becoming altered and membrane surrounding the embryo becoming visible
- 11 5th day—blood vessels spreading over almost the entire surface of yolk, embryo larger, and now surrounded by a protective circle of albumen through which the blood vessels pass
- 12 A portion of No. 11 enlarged, showing the blood vessels feeding the heart, eye of chicken visible
- 13 Embryo on 5th day dissected from the yolk, showing the membrane which envelops it when in the shell, also the elongated end of vertebral column
- 14 Appearance on removing portion of shell on 5th day, differing from No. 11 of same period, embryo being completely covered by blood vessels
- 15 Embryo of No. 14 removed from shell and slightly magnified showing rudimentary limbs
- 16 6th day—showing embryo of chicken now surrounded by a quantity of thinner albumen and chicken sinking into a cavity forming in the yolk
- 17 Embryo of No. 16 dissected from the yolk and magnified, showing its natural position at this period surrounded by albumen with blood vessels absorbing its nourishment from the yolk, and conveying it to the chicken by the umbilical cord
- 18 7th day—showing the chicken resting in the now well-formed folds of the yolk, with the main artery passing into the chicken
- 19 Embryo of No. 18 removed from shell and membrane, showing development of wings
- 20 No. 19 enlarged to show formation of head at this period
- 21 Empty shell on 7th day showing well-expanded membrane of air space
- 22 8th day—showing air space at broad end of shell and chicken sunk into a cavity between folds of yolk
- 23 9th day—opened more on the side of egg to show the formation of the cavity and folds of yolk. The yolk also becoming more granular in appearance.
- 24 The entire contents of shell removed on 9th day and placed in position to show the under surface of yolk, and back of chicken, yolk at this period having few blood vessels on under surface
- 25 9th day—removed from shell showing first formation of beak. Blood vessels larger (compare with No. 13)
- 26 Showing the effect of temperature of 120 degrees on 9th day for several hours, blood vessels expanded to utmost, and altered in appearance
- 27 10th day—showing well-developed folds of yolk and chicken somewhat altering its position
- 28 11th day—portion of covering membrane removed, showing position of main artery
- 29 11th day—shell opened near broad end of egg and covering membrane removed, showing chicken resting in a well-fitting cavity of yolk
- 30 11th day—removed from shell and covering membrane, showing growth of limbs and beak
- 31 11th day—contents of shell removed, yolk perforated and contents withdrawn, showing the membrane surrounding the chicken, and the method of absorbing its nourishment from the surface of yolk
- 32 11th day—removed from shell and slightly enlarged, showing growth of beak and body
- 33 11th day—contents of shell removed without breaking yolk membrane, and chicken placed in position to show two well-formed curves in main artery. For use, see No. 44
- 34 11th day—showing well-expanded air space
- 35 12th day—showing appearance of membrane and blood vessels, on carefully removing a portion of the shell
- 36 12th day—covering membrane removed, showing chicken turning its position, feathers appearing, also showing the membrane of air space
- 37 12th day—removed from shell
- 38 12th day—entire contents of shell removed, showing the white of the egg being absorbed by the yolk
- 39 Showing appearance of covering membrane on 13th day
- 40 13th day—with membrane removed, showing head of chicken coming nearer to air space
- 41 14th day—appearance on removing shell
- 42 14th day—removed from shell, showing growth of limbs
- 43 15th day—appearance of covering membrane, also well-developed air space and its membrane
- 44 15th day—covering membrane removed, showing the now well-formed curves of main artery to allow of free movement of limbs
- 45 15th day—removed from shell
- 46 16th day—membrane removed, showing main artery close to membrane of air space for aeration of blood
- 47 16th day—opened from opposite side of shell to No. 46
- 48 16th day—entire contents of shell removed, showing but a small portion of white of egg left, but large amount of yolk, partially divided into two lobes, between which the chicken rests when enclosed in shell
- 49 17th day—portion of membrane removed
- 50 17th day—membrane removed, showing main artery passing close to air space and head of chicken getting into position for hatching
- 51 17th day—entire contents of shell removed, showing the still unabsorbed yolk, also the blood vessels of membrane round the shell
- 52 17th day—showing chicken with swollen neck, head in wrong position, and dead
- 53 Showing No. 52 from other side, with yolk removed
- 54 17th day—removed from shell

THE EMBRYOLOGY OF A CHICKEN—(continued).

- 55 18th day—showing head of chicken almost in position for hatching, with beak near junction of membrane of air space and shell
 56 19th day—showing chicken in correct position for hatching, beak close to junction of membrane of air space and shell
 57 19th day—removed from shell
 58 19th day—showing large amount of yolk still unabsorbed
 59 No. 58 removed from shell in its natural position
 60 20th day—removed from shell
 61 20th day—showing still unabsorbed yolk
 62 20th day—shell opened opposite side of No. 61
 63 21st day—shell carefully peeled off, showing chicken apparently bound by now almost useless blood vessels

- 64 Showing position assumed by No. 63, on cutting the binding cords
 65 21st day—removed from shell, showing the remaining portion of unexhausted yolk being absorbed into the body of chicken, thus providing its nourishment for short period after hatching
 66 End of air space opened on 21st day, showing the loose folds of membrane surrounding the now restless chicken
 67 Coming through the shell
 68 Five hours later
 69 A snap shot one hour later
 70 Chicken twelve hours after hatching

CA

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- 1 Sebright Bantams, Pair of Silver-faced.
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"A perfect educational code of Bee-keeping."—BRITISH BEE JOURNAL.

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| <ol style="list-style-type: none"> 1 The Queen, Drone, and Worker Bee 2 Tongue of Honey Bee (Apis Mellifica) 3 Eye of Bee 4 Tip of ditto, showing Spoon 5 Front leg of Bee, showing Antenna Cleaner 6 Hind leg, showing Pollen Basket and Comb 7 Bee's Wing, Hooklets and Folded Membrane 8 Sting of Honey Bee 9 Lancets and Sheath of Sting of Bee 10 Abdomen of Bee 11 Salivary Gland 12 Parasite of Honey Bee—Braula Coeca 13 Foot of Braula Coeca 14 Apiary of Straw Hives 15 Old-fashioned Cottage Apiary 16 Modern Apiary of Frame Hives 17 Bee-keeper Folding Sections 18 Putting Foundations in Sections 19 Sections in various stages of progress 20 Fitting Comb Foundations in Frame [clearers] 21 Hive with Supers and Sections: showing super 22 Manipulating in Bee-dress and veil 23 Hiving a Swarm under difficulties 24 Hiving Bees in Frame Hive 25 Ditto (watching for the Queen) 26 Uncovering the Frames, using the Smoker 27 Manipulating Frame, hanging position 28 " " bottom upwards | <ol style="list-style-type: none"> 29 Catching the Queen 30 Driving Bees from the Hive into an empty Skep 31 Subdued Bees after driving 32 Driven Bees entering Skep. (Looking for the Queen Bee) 33 Frame of Comb, with Queen Cells 34 Group of Queen Cells, showing the opening at the end, with cover [Queen Cell] 35 Development of Larvæ, Queen Cell, Section 36 Egg attached to Cell Base 37 Pupa and Larva 38 Uncapping Combs for Extracting 39 Comb showing Foul Brood 40 Bacillus Alvei (Foul Brood in Bees) 41 " " (Rods and Spores) 42 " " (Spores) 43 Section of Bee 44 " " Eye of Bee 45 Heads of Bees 46 Egg and Pupa 47 Legs of Bee showing Comb 48 Various Glands 49 Wax Plates 50 Foot of Bee 51 Rows of Hives in a Fruit Orchard. 52 A Cluster of Hives, Modern Method. 53 The late Mr. Broughton Carr. |
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- 5 Garden Spider, *Epeira Diademata*
- 6 Spider, *Aranea Avicularia*
- 7 Large and Small White Butterfly, *Pieris Brassicae*
Rape

- 8 Colorado Potato Beetle, *Doryphora tentineola*
- 9 Wasp, *Vespa Vulgaris*
- 10 Crane Fly, *Tipula Oleracea*
- 11 Locust, *Gryllus Dux*
- 12 The Terebro. A Mollusc which eats into the
Submarine Cable

INJURIOUS INSECTS.

A U

AND COMMON FARM PESTS.

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Larva, Pupa, and Perfect Insect
- 4 GREAT YELLOW UNDERWING MOTH. *Tryphena*
proruba
Larva, Pupa, and Perfect Insect
- 5 WHEAT-BULB FLY. *Hylemyia coarctata*
Larva, Pupa, and Insect
Specimen of Injured Wheat
- 6 GOIT FLY. *Chlorops tenebrosus*
Larva, Pupa, Perfect Insect, and In-
jured Barley Stems
- 7 WIREWORM AND CLICK BEETLE. *Elatér (Agriotes)*
lineatus
WIREWORM, GRUB OF CLICK BEETLE ;
Eggs, Pupa, Beetle, and young turnip
with fibres of root destroyed by
gnawing of wireworms
- 8 TURNIP SAWFLY. *Athalia spinarum*
Caterpillar, Hybernating Caterpillar in
cocoon of Silk and earth, Pupa in
similar cocoon, Perfect Insect
- CARROT FLY. *Psila rosea*
Maggot, Pupa, Perfect Insect, and In-
jured Carrot
- 10 EARWIG. *Forficula*
Common Earwig, Female, *Forficula*
auricularia
Ditto in young stage; and
Forficula forcipata, Male
- 11 COCKCHAFER. *Melolontha vulgaris*
Larva, Pupa, and Perfect Insect
- 12 LARGE WHITE BUTTERFLY. *Pieris brassicae*
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First Stage of Maggot; Second Stage,
Third Stage, Pupa, and Perfect Fly
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Male and Female
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semorum
Maggot, Pupa, and Perfect Insect
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Pupa in early stage, also showing Wing
Cases, Male Aphis, Female Aphis
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Male Beetle and Female Beetle, Plum stems
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- 23 POTATO THRIPS. *Thrips Minutissima*
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displayed, and Larva
- 24 THE WOOD WASP. *Sirex Gigas*
Male. Medium spied of wings, Larva,
Sirex Juvenous, female, size various
- 25 COMMON VAPOURER MOTH. *Oryia Antiqua*
Male Moth, Female, Eggs on Cocoon.
Pupa in net-work Cocoon, Caterpillar
- 26 THE DIAMOND-BACK MOTH. *Plutella Cruciferarum*
Moth with wings extended. Moth at
rest. Pupa in net-work Cocoon
Caterpillar
- 27 CORN APHIS. *Aphis (Siphonophora) Granaria*.
Winged Female. Wingless Female
Larva. Empty Shell of Larva from
which a Parasite has hatched
- 28 SCALE INSECTS. *Aspidiotus Ostryaformis*. Oyster
Scale (Pear tree) outside and inside
view, and Female. *Aspidiotus Zonatus*
type of males of all the Diaspina
Mytilaspis Pomorum, Mussel Scale
(Apple) outside view. Inside view
showing the Eggs, Female Scale In-
sect shrunk after egg-laying
Pear Tree | Branches showing natural
Apple Tree | size of scale
- 29 PLANT BUG. *Lygus Umbellatorum*
Flying, at rest. Pupa of *Lygus Solan*
- 30 APPLE SAWFLY. *Tenthredo (Hippocampa) Testu-*
dinus
Larva, and injured Apple
- 31 PEAR OR CHERRY TREE SAWFLY OR SLUG WORM
Tenthredo Cerasi or *Eriocampa Limacina*
Larva in two stages, Cocoon

Larvæ.

- 33 GREEN GARDEN CHAFER. *Cetonia Aurata*
CABBAGE OR TURNIP GALL WEEVIL. *Ceutorhynchus*
Sulcolius
- WIREWORM (Grub of Click Beetle.) *Elatér Lineatus*
- ONION FLY. *Anthomyia Ceparum*
- DADDY LONGLEGS. *Tipula Oleracea*
- 38 LEOPARD MOTH. *Zenocera Aesculi*
- WINTER MOTH. *Chimatobia Brumata*
- CLOUDED YELLOW BUTTERFLY. *Colias Edusa*
- WOOL-GATHERING BEE. *Anthidium Manicatum*
- FOX-COLOURED PINE SAWFLY. *Lophyrus Rufus*
- 34 POTATO THRIPS. *Thrips Minutissima*
- LETTUCE GREENFLY. *Aphis Lactuca*
- EARWIG. *Forficula Auricularia*
- LESSER ROCKY MOUNTAIN LOCUST. *Calo tenus*
atlantis

A U INJURIOUS INSECTS AND COMMON FARM PESTS—*Continued.*

From "Agricultural Entomology," by Miss E. A. ORMEROD.

- 35 AMERICAN BLIGHT (WOOLLY APHIS). *Schizoneura lanigera*
Infested Apple-Spray. Wingless Viviparous Female and Young, and small Egg-bearing Female. Pupa
- 36 BEAN APHIS. *Aphis fabae*, Linn.
Bean-shoot, with Aphis. Male and Wingless Female
- 37 CURRANT GALL MITE. *Phytoptus* (species?)
Infested Buds
- 38 RED SPIDER. *Tetranychus telarius*
Whole Insect, and Hairs on the Foot
- 39 CEELEY AND PARSHIE FLY. *Tephritis oenopordiae*, Fab.
Whole Insect Maggot and Pupa figured in blistered leaf
- 40 GOOSEBERRY AND CURRANT SAWFLY. *Nematix ribesii*
Male Sawfly, Caterpillars and Cocoon
- 41 MANGOED OR BRET FLY. *Anthomyia* (*Chortophila*) *beta*
Female Fly, Pupa, Eggs
- 42 ONION FLY
Maggot and Pupa. Pupa in stored Onion
- 43 SAWFLY CATERPILLARS destroying Turnip-leaf
- 44 TURNIP SAWFLY. *Hymenoptera*
Caterpillars, Pupa, Pupa-case
- 45 BEAN BEETLES, Grub and Pupa, Injured Beans.
PEA BEETLE, Injured Pea
- 46 ELM-BARK BEETLE and Maggot workings in bark
- 47 MELIGETHES BEETLE. *Meligethes aeneus*
Beetle, Maggot, Infested Flower
- 48 MUSTARD BEETLE
Whole Insect, Grub
- 49 BLACK VINE WEEVIL. *Otitus sulcatus*
Whole Insect, Maggot and Pupa
CLAY-COLOURED WEEVIL. *O. picipes*, Fab.
(*septentrionalis* Steph. Marl.)
- 50 NUT WEEVIL
Whole Insect, Maggot, Pupa. Filbert pierced by Weevil
- 51 RASPBERRY BEETLES. *Byturus tomentosus*
Whole Insect, Maggot. Raspberry Fruit
- 52 CODLIN MOTH. *Carpocapsa pomonella*
Whole Insect, Caterpillar. Apple infested with Caterpillars.
- 53 THE CURRANT CLEARWING. *Ageria tipuliformis*
Moth, Larva in Currant Stem
- 54 THE SMALL ERMINE MOTH. *Hyponomeutia padella*.
Tasch
Moth Larva
- 55 MAGPIE MOTH; CURRANT MOTH. *Abrazas grossulariata*
Moth, Larva
- 56 WINTER MOTH; EVERSHAM MOTH. *Cheimatobia brumata*
Male, and Wingless Females
- 57 WOOD LEOPARD MOTH. *Zeuzera aesculi*
Female, Head of Male, and Caterpillar
- 58 FIELD OR MILKY SLUG. *L. agrestis*
BLACK SLUG. *L. ater* (var. *empiricornum*)
Whole Insect, in repose, Eggs

B. B**ROOT CROPS.**

This series has been produced under the personal supervision of Messrs. Sutton & Sons, of Reading.

Text Book, "Sutton's Farmer's Year-Book."

Beautifully Painted, 6s.; Plain Photographs, 2s.

- | | | |
|----------------------------------------|----------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1 Improvement of Mangel by cultivation | 10 Imperial Green Globe Turnip | 19 Improved Thousand-headed Cabbage or Kale |
| 2 Oxheart Orange Globe Mangel | 11 Purple-top Mammoth Turnip | 20 Early Drumhead Cabbage, Improved Large Late Drumhead Cabbage, Drumhead Savoy |
| 3 Berks Prize Yellow Globe Mangel | 12 Red Paragon Turnip | 21 Improved Yellow Intermediate Grand White Belgian and Long Red Altringham Carrots |
| 4 Golden Tankard Mangel | 13 Pomeranian White Globe Turnip | |
| 5 Yellow Intermediate Mangel | 14 Crimson King Swede | |
| 6 Crimson Tankard Mangel | 15 Champion Purple-top Swede | |
| 7 Mammoth Long Red Mangel | 16 Champion Short-top Kobi Rabi | |
| 8 Favourite Turnip (Yellow Beaked) | 17 White Belgian and Red Intermediate Carrot | |
| 9 All the Year Round Turnip | 18 Early Ox-heart, Imperial, and Thousand-headed Cabbage | |

B Y PROFITABLE CULTIVATION OF SUGAR BEET.

Published by kind permission of the Chilean Nitrate Committee.

Beautifully Coloured Slides, 6s. each. Plain Slides, 2s. each.

Printed Notes can be supplied with the Slides.

- | | |
|-------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1 A British Sugar Beet Factory. Illustrating Root System of Sugar Beets and great feeding area. | 17 Filling and weighing sacks of sugar. |
| 3 Varieties of Sugar Beet. | 18 Sugar Stofe. |
| 4 Varieties of Sugar Beet. | 19 Loading sugar on railway trucks. |
| 5 Fungy roots due to bad cultivation. | 20 A sack of sugar. |
| 6 Effect of subsoiling. | 21 A silo for tops and pulp—side view. |
| 7 Singling. | 22 A silo for tops and pulp—front view. |
| 8 Sugar Beet Lifter and subsoiler combined. | 23 H. Hone etc. |
| 9 Lifting, pulling and topping Sugar Beet. | 24 Messrs. B. nnett & Nicholson, etc. |
| 10 Lifted Beet. | 25 R. J. Cordingley, etc. |
| 11 Lifting Beet. | 26 G. Ball, etc. |
| 12 Some good roots. | 27 J. G. Whittles, etc. |
| 13 Badly topped roots and correctly topped roots. | 28 D. W. Hardley, etc. |
| 14 Carting Sugar Beet. | 29 W. Weavers, etc. |
| 15 Unloading Beet at Factory. | 30 Official Trials by the Worcestershire County Council at Perdiswell, etc. |
| 16 Unloading Beet at Factory. | 31 Messrs. Brintons, Ltd., etc. |
| | 32 H. H. Harris, etc. |
| | 33 R. Parry, etc. |

For a Set of Slides on the Manufacture of Beetroot Sugar, see Industries, Section 7 of this Catalogue.

B G**ALLOTMENTS—GARDEN PRODUCE.**

This Series of Slides, showing various Vegetables and Fruits suitable for growing on Parish Allotments, has been arranged by Messrs. Sutton and Sons, of Reading. The slides are photographs of actual specimens, that have been grown from this Firm's Seeds, and are not from imaginary drawings.

Beautifully Coloured, 6s. ; Plain Slides, 2s. each.

- 1 Asparagus. Bunch of Sutton's Perfection
- 2 Broad Beans. Pods of Sutton's Green Longpod compared with the ordinary variety and pods of Sutton's Giant Windsor, showing relative sizes
- 3 Dwarf Beans. Single plant of Sutton's Triumph
- 4 Runner Beans. Cluster of pods of the climbing French Bean, Sutton's Tender and True, and a cluster of pods of Sutton's Scarlet, showing relative sizes
- 5 Kale. Single plant of Sutton's A 1
- 6 " Sutton's Drumhead and Sutton's Arctic Green and Purple
- 7 Brussels Sprouts. Sutton's Exhibition, Sutton's Dwarf Gem, and Sutton's Watsoless, the three varieties showing relative height and character
- 8 Broccoli. Two specimens each of Sutton's Superb Early white, and Sutton's Late Queen
- 9 Cabbage. Portion of a plot of Sutton's Earliest, and 3 plants of Sutton's Imperial
- 10 Carrots. Sutton's New Red Intermediate, bunch of 5, compared with two specimens of James's Scarlet Intermediate, showing proportionate size
- 11 Carrots. Sutton's Early Gem, bunch of 8, and Sutton's Champion Horn, bunch of 12, showing relative sizes
- 12 Capsicum and Chili. Sutton's Coral Red, Sutton's Mammoth Long Red, and East India Cayenne Chili, Sutton's Erect fruiting, Golden Dawn, and Mammoth Long Red Capsicum
- 13 Cauliflower. Two specimens each of Sutton's Autumn Mammoth, and Sutton's Magnum Bonum
- 14 Lettuce. Plot showing Sutton's Favourite Cabbage and Sutton's Mammoth White Cos in growth
- 15 Lettuce. Three plants of Sutton's White Heart Cos
- 16 Marrow. Group of 5 varieties. Sutton's Long White, Sutton's Long Green, Sutton's Vegetable, Long Cream and Penny-Byd, showing comparative sizes
- 17 Melon. Single fruit of Sutton's Hero of Lockinge
- 18 " Single fruit with slice removed of Sutton's Scarlet
- 19 " Single fruit with slice removed of Sutton's Royal Favourite
- 20 " Photograph of a growing crop of Sutton's Royal Favourite, in Melon house at the Royal Gardens, Windsor
- 21 Mushroom. Showing bed in Mushroom house
- 22 " An enlarged single specimen. Illustrating typical Mushroom
- 23 Onion. A bunch of Sutton's Improved Queen
- 24 " Two specimens of the Sutton Globe and 3 specimens of Sutton's A 1, showing comparative sizes and form, and are reproduced on the same scale as No. 23 (Sutton's Improved Queen)
- 25 Peas. Pods of Sutton's Bountiful and Kentish Invicta, showing comparative sizes
- 26 " Pods of Sutton's Exhibition Marrowfat and Yorkshire Hero, showing comparative sizes, and pods of Sutton's Bountiful
- 27 " Pods of Sutton's Early Marrowfat and Prince of Wales, showing comparative sizes
- 28 " Growing plants in pot of Sutton's Seedling Marrowfat, showing suitability for forcing
- 29 " Pods of Sutton's Empress of India, and Sutton's Late Queen
- 30 " Pods of Sutton's Early Marrowfat and Sutton's Windsor Castle
- 31 " Pods of Sutton's Perfection and Sutton's Magnum Bonum
- 32 " Sutton's A 1 (wrinkled) and Sangster's No. 1, pods showing comparative sizes
- 33 " Illustrating the process of handpicking peas for seed
- 34 Savoy. Sutton's Dwarf Green Curled, single plant
- 35 Turnip. Sutton's Early Snowball, several specimens and basket
- 36 Tomato. A bunch of six specimens of Sutton's Perfection and bunch of 32 fruits of Sutton's Golden Nugget, illustrating the two most dissimilar types of tomato, and showing comparative sizes
- 37 Potato. Sutton's Satisfaction and Sutton's early Regent in baskets
- 38 " Sutton's Magnum Bonum and Sutton's Windsor Castle in baskets
- 39 " Sutton's A 1 in basket
- 40 " Illustrating the process of handpicking potatoes for seed
- 41 First Prize Exhibit, Royal Caledonian Horticultural Society's Show, September, 1905
- 42 Sutton's Globe Beet
- 43 Sutton's Perfection Beet
- 44 Sutton's Cascade Tomato

U Q**GARDEN PRODUCE.**

Published by the kind permission of MESSRS. SUTTON & SONS, of Reading.

Beautifully Painted, 6s. ; Plain Slides, 2s. each.

- 1 White Jerusalem Artichoke
- 2 Giant French Asparagus
- 3 Blood Red Beet
- 4 Blood Red Garden Beet
- 5 Broccoli. Superb Early White
- 6 Snow-White Broccoli
- 7 Brussels Sprouts. Sutton's Exhibition
- 8 Broad Beans. Green Giant
- 9 Giant Windsor Broad Beans
- 10 Climbing French Bean. Earliest of All
- 11 Princess of Wales. French Climbing Beans
- 12 Dwarf French or Kidney Beans. Perfection
- 13 Dwarf French or Kidney Beans. Plentiful
- 14 Runner Beans. Best of All
- 15 Garden Cabbage. Earliest
- 16 Garden Cabbage. Flower of Spring
- 17 Imperial Garden Cabbage
- 18 Short Carrot. Inimitable Forcing
- 19 Carrot. Scarlet. Intermediate
- 20 Cauliflower. Purity
- 21 Pigmy Chili
- 22 New Cucumber. Lord Roberts
- 23 Giant Hemp
- 24 Arctic Kale
- 25 Extra Curled Scotch Kale
- 26 Cabbage Lettuce. Favourite
- 27 Cos Lettuce. White Heart
- 28 Cos Lettuce. Mammoth White
- 29 Marrow. Perfection
- 30 Melon. Ringleader
- 31 Group of Mushrooms
- 32 Onion. Improved Queen
- 33 Garden Peas. Nonpareil Marrow
- 34 Garden Peas. Nonsuch
- 35 Lord Roberts. Garden Peas
- 36 Duchess of York. Garden Peas
- 37 Potatoes. Invincible
- 38 Potatoes. Satisfaction
- 39 Potatoes. Triumph
- 40 Radish. Earliest of All
- 41 Long Radish. Earliest Frame
- 42 Radish. Forcing White Oliver
- 43 Turnip. White Gem
- 44 A Potato. Curious formation like a duck. Messrs. Cannell and Sons)

B I

PASTURE GRASSES.

This series has been arranged by Martin J. Sutton, Esq., of Reading, Fellow of the Linn. Soc., and Member of the Councils of the Royal Agricultural Society and Bath and West and Southern Counties Society, and the slides are taken from the fine illustrations in his work on "Permanent and Temporary Pastures."

The odd numbers in the following list show the whole plant, root, stem and flower; while the even numbers give a description of the grass and a magnified drawing of the seed with and without chaff.

Text Book, "Permanent and Temporary Pastures," price 1s. Simpkin & Co.

Beautifully Painted, 5s.; Plain Photographs, 2s. each.

- | | | | |
|----|------------------------------------------------------------------------------------------|----|----------------------------------------------------------------------|
| 1 | <i>Agrostis Alba</i> —var. <i>stolonifera</i> (<i>Florida or Creeping, Bent Grass</i>) | 23 | <i>Lolium perenne</i> (<i>Perennial Rye Grass</i>) |
| 2 | " " Seed and Description | 24 | " " Seed and Description |
| 3 | <i>Alopecurus pratensis</i> (<i>Meadow Foxtail</i>) | 25 | <i>Lolium italicum</i> (<i>Italian Rye Grass</i>) |
| 4 | " " Seed and Description | 26 | " " Seed and Description |
| 5 | <i>Anthoxanthum odoratum</i> (<i>Sweet-scented Vernal</i>) | 27 | <i>Phleum pratense</i> (<i>Timothy or Meadow Catstail</i>) |
| 6 | " " Seed and Description | 28 | " " Seed and Description |
| 7 | <i>Avena flavescens</i> (<i>Yellow Oat Grass</i>) | 29 | <i>Poa pratensis</i> (<i>Smooth-stalked Meadow Grass</i>) |
| 8 | " " Seed and Description | 30 | " " Seed and Description |
| 9 | <i>Cynosurus cristatus</i> (<i>Crested Dogtail</i>) | 31 | <i>Poa trivialis</i> (<i>Rough-stalked Meadow Grass</i>) |
| 10 | " " Seed and Description | 32 | " " Seed and Description |
| 11 | <i>Dactylis Glomerata</i> (<i>Rough Cockfoot</i>) | 33 | <i>Poa nemoralis sempervirens</i> (<i>Evergreen Meadow Green</i>) |
| 12 | " " Seed and Description | 34 | " " Seed and Description |
| 13 | <i>Festuca pratensis</i> (<i>Meadow Fescue</i>) | 35 | <i>Trifolium repens perenne</i> (<i>Perennial White Clover</i>) |
| 14 | " " Seed and Description | 36 | " " Botanical description |
| 15 | <i>Festuca elatior</i> —var. <i>fertilis</i> (<i>Tall Fescue</i>) | 37 | <i>Trifolium pratense</i> (<i>Red, or Broad Clover</i>) |
| 16 | " " Seed and Description | 38 | " " Botanical description |
| 17 | <i>Festuca heterophylla</i> (<i>Various-leaved Fescue</i>) | 39 | <i>Trifolium pratense perenne</i> (<i>Perennial Red Clover</i>) |
| 18 | " " Seed and Description | 40 | " " Botanical description |
| 19 | <i>Festuca ovina tenuifolia</i> (<i>Fine-leaved Sheep's Fescue</i>) | 41 | <i>Trifolium hybridum</i> (<i>Alsike Clover</i>) |
| 20 | " " Seed and Description | 42 | " " Botanical description |
| 21 | <i>Festuca durinacula</i> (<i>Hard Fescue</i>) | 43 | <i>Medicago lupulina</i> (<i>Common Yellow Clover, or Trefoil</i>) |
| 22 | " " Seed and Description | 44 | " " Botanical description |
| | | 45 | <i>Achillea millefolium</i> (<i>Fennel, or Milfoil</i>) |
| | | 46 | " " Botanical description |

B H

INJURIOUS GRASSES AND WEEDS.

This series, like the "Pasture Grasses," has been produced from a set of original drawings under the instructions of Martin J. Sutton, Esq., Fellow of the Linnæan Society and Member of the Councils of the Royal Agricultural Society and Bath and West and Southern Counties Society.

Beautifully Painted, 5s.; Plain Slides, 2s. each.

GRASS WEEDS.

- | | | | |
|---|------------------------------------------------------------------|----|---------------------------------------------------------------|
| 1 | <i>Briza media</i> (<i>Quaking Grass</i>). | 6 | <i>Aira (Deschampsia) coarctata</i> (<i>Tassock Grass</i>). |
| 2 | <i>Alopecurus geniculatus</i> (<i>Floating Foxtail Grass</i>). | 7 | <i>Molinia coerulea</i> (<i>Purple Heath Grass</i>). |
| 3 | <i>Bromus erectus</i> (<i>Erect Brome Grass</i>). | 8 | <i>Festuca pyramis</i> (<i>Barren Fescue Grass</i>). |
| 4 | <i>Bromus mollis</i> (<i>Soft Brome Grass</i>). | 9 | <i>Avena pubescens</i> (<i>Soft Oat Grass</i>). |
| 5 | <i>Triticum (Agropyrum) repens</i> (<i>Couch Grass</i>). | 10 | <i>Holcus lanatus</i> (<i>Yorkshire Fog Grass</i>). |

MISCELLANEOUS WEEDS.

- | | | | |
|----|----------------------------------------------------------------|----|------------------------------------------------------------|
| 11 | <i>Tussilago farfara</i> (<i>Coltsfoot</i>). | 17 | <i>Rumex acetosella</i> (<i>Sheep's Sorrel</i>). |
| 12 | <i>Poterium sanguisorba</i> (<i>Common Burnet</i>). | 18 | <i>Rumex acetosa</i> (<i>Common Sorrel</i>). |
| 13 | <i>Plantago lanceolata</i> (<i>Plantain or Ribwort</i>). | 19 | <i>Conium maculatum</i> (<i>Hemlock</i>). |
| 14 | <i>Rumex obtusifolius</i> (<i>Field Dock</i>). | 20 | <i>Rhinanthus crista-galli</i> (<i>Yellow Rattle</i>). |
| 15 | <i>Cuscuta trifolii</i> (<i>Clover Dodder</i>). | 21 | <i>Centaurea nigra</i> (<i>Knapsweed or Black Head</i>). |
| 16 | <i>Anthemis cotula</i> (<i>Faetid Mayweed or Chamomile</i>). | | |

SLIDE BOXES

Particulars of boxes of all kinds for storing and carrying will be found on page 235.

BF ILLUSTRATIONS FROM THE RESULTS OF THE ROTHAMSTED EXPERIMENTS.

Published under the authority of the Lawe's Agricultural Trust.

Beautifully Painted 6s. 6d. ; Plain Photographs, 2s. each.

- Nos. 1, 2 and 3 Coloured Tables of results of experiments on the growth of Root-crops for many years in succession on the same land:—
1 White Turnips, and Swedish Turnips, commencing 1843
2 Sugar Beet, 5 years, 1871-5
3 Mangel Wurzel, commencing 1876
- No. 4—Coloured Table of results of Experiments on the growth of Barley, for many years in succession on the same land, commencing 1854
- Nos. 5, 6, 7 and 8—Coloured Tables of results of experiments on the growth of various Leguminous Crops, each for many years in succession on the same land, commencing 1847:—
5 Produce of Beans, per acre per annum
6 Nitrogen in the Produce of Beans, per acre per annum
7 Produce of Red Clover (as Hay), on ordinary arable land
8 Produce of Red Clover (Hay and Constituents), on rich Garden-soil
- No. 9—Coloured Table of results of Experiments on the Growth of Wheat, for many years in succession on the same land, commencing 1843-4
- Nos. 10, 11, 12 and 14—Coloured Tables of results of Experiments on Rotation of Crops; 45 years, commencing 1848:—
10 (1) Swedish Turnips, produce per acre; 12 courses
11 (2) Barley, produce per acre; 11 courses
12 (3) Clover or Beans, produce per acre; 11 courses
13 (4) Wheat, produce per acre; 11 courses
14 (5) Average produce, and yield of Nitrogen per acre per annum; 3 courses
- No. 15—Photographs of Roots (Swedish Turnips), grown in Rotation without Manure, with Mineral Manure, and with Mineral and Nitrogenous Manure
- No. 16, 17 and 18—Photographs of various Leguminous plants, grown in Experiments on the Fixation of Free Nitrogen:—
16 Peas, Vetches, and Yellow Lupins; grown in pots
17 Peas; grown in pits
18 Sainfoin; grown in pits
- No. 19—Table of Results relating to Nos. 17 and 18
- Nos. 21 and 22—Coloured Tables of results of Experiments on the Growth of Potatoes, for many years in succession on the same land, commencing 1876:—
21 Manures, and Produce per acre (Sound and Diseased)
22 Specific Gravity, and Percentage Composition, of Sound Tubers
- Nos. 23, 24, 25 and 26—Coloured Tables of results of Experiments on the Mixed Herbage of Permanent Grass for many years in succession on the same land, commencing 1856:—
23 Manures, and Produce (as Hay), per acre per annum
24 Botanical Composition of the Herbage
25 Summary of the Botanical Composition, per cent., per acre, &c.
26 Summary of the Chemical Composition of the Produce, per acre
- No. 27—Table of results of Experiments on Wheat grown in alternation with Fallow, and Wheat grown year after year continuously, without Manure—43 years, 1850-1 to 1891-2
- No. 28—Table showing the Home Produce, Import Consumption, and Price, of Wheat, in the United Kingdom—40 Harvest-years, 1852-3 to 1891-2 inclusive
- No. 29—List of the Rothamsted Field Experiments
- No. 30—Plan of the Plots in Barusfield, on which the experiments with Root-crops have been made
- No. 31—Plan of the Plots in Hoosfield, on which Experiments have been made:—
(1) On Barley, commencing 1854
(2) On Leguminous Crops, commencing 1849
(3) On Alternate Wheat and Fallow, commencing 1861
(4) On Potatoes, commencing 1876
- No. 32—Plan of the Plots in Broadbalk-field, on which Wheat has been grown for more than 50 years in succession, commencing 1843-4
- No. 33—Plan of the Plots in Agdell Field, on which Experiments on Four-Course Rotation have been made, commencing 1848
- No. 34—Plan of the Plots in the Park, on which experiments have been made on the Mixed Herbage of Permanent Grass-land, commencing 1856
- No. 35—Photographs and Plans of the Rothamsted Laboratory
- No. 36—Photographs and Plan of the Rothamsted Sample House
- No. 37—Coloured Drawing and Description of the Rothamsted Rain gauges
- No. 38—Coloured Drawing and Description of the Rothamsted Drain gauges
- No. 39—Table showing the Rainfall at Rothamsted, measured in a gauge one-thousandth of an acre area—40 Harvest-years, 1852-3 to 1891-2
- No. 40—Table showing the Rainfall; also the amount of Percolation through Drain-gauges containing, respectively, 30 inches, 40 inches, and 60 inches, depth of Unmanured, and uncropped Soil and Subsoil, in natural state of consolidation—22 Harvest years 1870-1 to 1891-2
- No. 41—Table showing the loss of Nitrogen (as Nitrates), respectively through 30 inches, 40 inches, and 60 inches depth of Soil and Subsoil, also the loss of Nitrogen calculated as Nitrate of Soda—15 Harvest-years 1877-8 to 1891-2
- No. 42—Table showing the amounts of Nitrogen supplied in Manure, and estimated to be recovered in Increase of Crop, lost in Drainage, accumulated as Crop-residue in the surface-soil, and not so accounted for, in the case of differently manured Wheat plots—averages per acre per annum for 30 Harvest years, 1851-2 to 1880-1
- No. 43—Table illustrating the loss of Nitrogen; as Nitrates, in a wet autumn and winter, in the drainage from the differently manured Wheat plots in Broadbalk-field; also the loss calculated as Nitrate of Soda: Season 1891-2, 49th year of the Wheat experiments
- No. 44—Coloured Diagrams illustrating the results of Experiments on the Feeding of Animals; showing the proportions of Nitrogenous, of Non-nitrogenous, and of Total Organic Substance consumed—I. Per 100 lb. live-weight per week. II. To Produce 100 lb. Increase in Live-weight.

BD

EFFECTS OF MANURES.

These slides are made from a series of photographs of actual specimens grown with various manures, and mostly contain from four to eight samples in each slide.

Beautifully Painted, 6s. Plain Photographic Slides, 2s. each,

- 1 Wheat. Experiment with and without Nitrogenous Manures
- 2 Barley. " " " "
- 3 Peas. " " " "
- 4 Oats. " " " "
- 5 Oats. Experiments with Green Manures
- 6 Peas and Oats. Experiments with and without Potash, Phosphoric Acid, and Nitrogen for comparison
- 7 Vetches. Experiments with and without Potash, Phosphoric Acid, and Nitrogen
- 8 Peas and Wheat. Yield of Experiments, with and without various manures
- 9 Summer Rye. Experiments with and without Superphosphate, in autumn and spring
- 10 Summer Rye. Experiments with and without Phosphate Powder, in autumn and spring
- 11 Barley. Experiments with and without Superphosphate and Phosphate Powder
- 12 Barley. Yield of experiments shown in a slide No. 11
- 13 Barley. Manurial Experiment on a Loamy Soil. (1) without Phosphoric Acid. (2) With Phosphoric Acid as Superphosphate. (3) With Phosphoric Acid as finely-pulverised Thomas' Phosphate
- 14 Buckwheat and Peas. Experiments with Phosphoric Acid and Potash
- 15 Oats. Green Manuring Experiments
- 16 " Yield of experiments with and without Green Manures
- 17 " Illustrating the Influence of Phosphatic Manuring on the Utilisation of Nitrate Nitrogen
- 18 " Experiments with and without Phosphoric Acid in different forms
- 19 Experiments with and without Superphosphate
- 20 Crop of Oats. Yield of experiments with various manures on (1) Clay Soil. (2) Soil rich in Humus
- 21 Crop of Oats and Barley. Yield of experiments with and without Phosphoric Acid on Clay Soil
- 22 Vetches and Wheat. Yield of experiments with and without Potash, Phosphoric Acid, and Nitrogen
- 23 Wheat. Experiments with (1) No Manure. (2) Potash and Phosphoric Acid. (3) Potash, Phosphoric Acid and Nitrogen
- 24 Maize. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 25 Hemp. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 26 Tobacco. Manurial Experiments with Nitrogen and Superphosphate, and Nitrogen and Phosphate of Potash
- 27 Beetroot. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 28 Carrots. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 29 Do. as above, showing roots
- 30 Field Beans. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 31 Peas. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 32 Potatoes. Manurial Experiments with Phosphoric Acid, Potash, and in addition, Nitrogen as Nitrate of Soda
- 33 Clover. Experiments with and without Phosphoric Acid in form of Superphosphate and Thomas' Phosphate Powder
- 34 Fuchsia. Manurial Experiments in Hot-bed Soil. Without Nutritive Salt Mixture and with small and larger quantities of Albert's Highly Concentrated Horticultural Mixture
- 35 Geraniums in Hot-bed Soil. Manurial Experiments with and without Albert's Highly Concentrated Horticultural Mixture

The following list of Slides &c., has been compiled by Sir E. J. RUSSELL, of Rothamsted Experimental Station.

The material is selected from books entitled "Soils and Manures," by Sir E. J. RUSSELL; "Manuring for Higher Crop Production," by Sir E. J. RUSSELL; "The Rothamsted Experiments," by A. HALL and Sir E. J. RUSSELL.

- 36 Tomatoes growing on a light sand with varying food supply. Pot 47, Without Manure. Pot 55, One Dose of Manure. Pot 63, Two Doses of Manure
- 37 Tomatoes grown in good soil, all equally manured but receiving different quantities of water. Pot 17, No Water added. Pot 19, 5 per cent. added and the moisture then kept constant. Pot 21, 10 per cent. added and the moisture then kept constant. Pot 24, 12½ per cent. added and the moisture then kept constant
- 38 Tomatoes grown in soil receiving successively increasing doses of manure in pots. Passing from left to right: Pots 3, 5, and 7, no manure. Pots 36, 38, 39, ten doses of manure. Top row, moisture maintained at 5 per cent. Middle row, moisture maintained at 10 per cent. Bottom row, moisture maintained at 12½ per cent.
- 39 Curves shewing weights of crop produced with varying supplies of water and 0.01 and 0.02 grams of nitrate of soda per pot
- 40 Dongas in South Africa caused by heavy rainfall
- 41 Alkali Spot. Fremont, Nebraska
- 42 Treeless Prairie. First Stage of Development
- 43 " " Last " " " " (An Experimental Farm)
- 44 Crop Map and Isotherms of Great Britain
- 45* Carrots grown on various types of soil
- 46 Chalk Subsoil. This land can be cultivated although the soil is thin
- 47 Gravel Subsoil. This land cannot be cultivated because the soil is too thin for a gravel subsoil
- 48 Mechanical composition of soils well adapted for Wheat
- 49* Mechanical composition of soils well adapted for Potatoes
- 50 Poor Clay Country. Roads wide but not all made up. Hedges and Gates not well kept
- 51 Effects of Fertilisers on Swedes. Pot 1, complete manure—phosphates and nitrogen compounds. Pot 3, incomplete manure—phosphates and potash, but not nitrogenous compounds. Pot 5, no manure
- 52 Effect of Potassic Fertilisers on Mangolds. Left-hand Plot, superphosphates and nitrogenous manure, no potassium salts. Right-hand Plot, superphosphates, nitrogenous manure, and potassium salts
- 53 Curves shewing effect of Farmyard Manure on Water Content of Soils.
- 54 The loss in making Farmyard Manure is much reduced by keeping the animals under cover

* Denotes that full details are shown on the Slide.

EFFECT OF MANURES—*Continued.*

- 55 If enough yard space is not available, part of the Dutch barn may be used
- 56* Effects of Storage of Farmyard Manure on yield of Potatoes
- 57* Losses of nitrogen from Cow Manure stored loosely
- 58 Worst way of storing Dung. Open to wind and rain
- 59 Useful type of Dungstead for Dairy Farms
- 60 Good Hay Plants. If the herbage is mainly like this, and in addition there is a good deal of clover, it is proof that the conditions are satisfactory
- 61 Poor Hay Plants. Signs that something is wrong. Yorkshire fog indicates wetness or sourness, downy out and quaking grass indicate poverty
- 62 Good Pasture Plants. Showing that conditions are satisfactory
- 63 Poor Pasture Plants, indicating that the conditions are not good. Rush indicates wetness, Bent indicates unsuitability for root development, Hawkbit and Trefol show poverty
- 64* Effect of Artificial Manures on yield and composition of hay
- 65* Effect of Slag on Grass Land, &c.
- 66* Average increase in live weight of Sheep, &c.
- 67* Broadbalk Wheat
- 68 Comparison of Nitrate of Soda and Ammonium Salts on Wheat
- 69* Wheat. Broadbalk yield. Comparison
- 70* Barley. Total produce showing residual effect of Dung and no Manure in relation to the dunzed plot
- 71* Effect of Mineral Manures on yield of Barley
- 72* Mangolds. Effect of various Mineral Manures
- 73* .. Effect of addition of Mineral Manure to Dung with various Nitrogenous Cross Dressings
- 74* Effect of the various Mineral Constituents with and without Nitrogen on the produce of Hay per acre
- 75* Effect of Nitrogenous Manures on produce of Hay per acre
- 76* Comparative effect of Clover or Bare Fallow on the succeeding crops in rotation
- 77* Crops grown in rotation. Relative yield on Manured and Unmanured Plots in the earlier and later years of the Experiment
- 78 Liming of Land.
- 79 Table—Application of Manures.
- 80 Varying Quantities of Manures.
- 81 Sainfoin in Sand. Experiment.
- 82 .. Details of roots.
- 83 Table. Digestibility and Manure Values.
- 84 Pit Experiment with White Clover.
- 85 Clover Dodder.

*Denotes that full details are shown on the Slide.

BC

POTATO DISEASE.

Beautifully Painted, 6s. 6d.; Plain Photographs, 2s. each.

The first four slides in this set are direct photographs of experiments made by the Warminster County Councils.

- 1 Plot of Potatoes, October, 1892, sprayed with Sulphate of Copper and Lime Dressing, 160 gallons to the acre, in July and August
- 2 Plot of Potatoes, October, 1892, not dressed
- 3 1 Perch of Potatoes (Imperators), half perch dressed, and half perch not dressed, October, 1892
- 4 Heaps of Potatoes, showing actual results of above experiments. Dressed, 209 lbs., Undressed, 177 lbs.
- 5 Sections of diseased and healthy Potatoes, and surfaces of diseased and healthy leaves
- 6 Fungus on Leaf, *Peronospora infestans*. Vert. Sect.

ADDITIONAL SLIDES.

Messrs. NEWTON will send particulars of 24 supplementary slides on Potato Disease. The slides have been prepared from a series of new and original negatives.

BE

NITRIFYING ORGANISMS IN SOILS.

Plain Photographs, 2s. each.

Photo-Micrographs by Prof. S. Winogradsky, of St. Petersburg.

- | | |
|-----------------------------------------------------------------|------------------------------------------------------------------------------|
| 1 Nitrous organism in soil from Zurich (Zoogloea stage) X 1,000 | 5 Nitrous organism in soil from Java (mobile stage), X 1,000 |
| 2 Nitrous organism in soil from Zurich (Zoogloea stage) X 1,000 | 6 Nitrous organism in soil from Kazan Russia X 1,000 |
| 3 Nitrous organism in soil from Zurich (mobile stage) X 1,000 | 7 Nitrous organism in soil from Genevilliers (grown on sealed jelly) X 1,000 |
| 4 Nitrous organism in soil from Java X 1,000 | 8 Nitrous organism in soil from Quito (Coccus) X 1,000 |
| | 9 Nitric organism in soil from Quito X 1,000 |
| | 10 Nitric organism in soil from St. Petersburg |
| | 11 Nitric organism in soil from Bonn |

B X Z THE MANUFACTURE OF CHILEAN NITRATE OF SODA.

Messrs. NEWTON are indebted to the Chilean Nitrate Committee for permission to publish an interesting set of Slides visualizing the varied stages from the opening up of the Nitrate Fields and the different processes through which it passes in the factory to the shipment of this useful fertiliser to all parts of the world.

Plain Slides, 2s. each.

BFO

THE NORWEGIAN NITRATE INDUSTRY.

Illustrating the production of Nitrate of Lime.

Printed Notes can be supplied with the Slides.

Full details of the above two sets will be found in "Industries," Section 7 of this Catalogue

For other sets of Slides published by kind permission of the Chilean Nitrate Committee see p. 210.

BO**FRUIT TREE CULTIVATION.**

The following photographs were taken by the kind permission of Mr. Francis Rivers, at his Nursery, Sawbridgeworth.

Beautifully Painted, 6s. each.

Plain Slides, 2s. 3d. each.

- 1 Grafting, Stock, Graft, Graft Cut, Graft inserted in Stock
- 2 Budding, Stock, Bud cut for inserting, Bud inserted, Bud tied in
- 3 Pruning a Pyramid Pear Tree
- 4 Maiden Cherry, 1 year old
- 5 Maiden Plum, 2 years old
- 6 Maiden Pear Tree
- 7 Pyramid Pear
- 8 " " in Fruit in Pot
- 9 " Pears, "Conference" and "Plumaster Duchess"
- 10 Bush Pear in Fruit
- 11 Goblet-shaped Pear Tree in Fruit
- 24 A Cluster of Red Gooseberries
- 25 A Cluster of Green smooth Gooseberries
- 26 A Cluster of Yellow Gooseberries
- 27 A Cluster of Morella Cherries

- 12 Diagonal Trained Pear in Fruit
- 13 Horizontal Trained Pear Tree
- 14 Fan Trained Plum
- 15 Upright Trained Apple, 5 Branches
- 16 Pyramid Apple Trees in Fruit in Pots
- 17 Standard Apple, 3 years old
- 18 " Pear "
- 19 " Plum "
- 20 Peach Trees, one year, pruned; and two years after pruning
- 21 Pyramid Peach grown in pot, 20 years old with 120 Peaches on it
- 22 Half Standard Peach
- 23 Bush Peach in Fruit

- 28 A Cluster of Cherries
- 29 A Cluster of Apples
- 30 A Sprig of Edible Chestnut Fruit

BFI**THE FRUIT FARMING INDUSTRY.**

Coloured Slides, 6s. 6d. each. Plain Slides, 2s. each.

By kind permission of Messrs. Chivers & Sons, Ltd., Heston, Cambridge.

- 1 Pumping solution for spraying Orchards
- 2 Spraying Fruit Trees
- 3 Spraying Fruit Trees. (Near view)
- 4 Bedding down Strawberries. (Straw)

- 5 Picking Raspberries
- 6 Picking Currants
- 7 Picking Greengages
- 8 Weighing in Fruit

By kind permission of Messrs. Wilkins & Sons, Ltd., Tiptree, Essex.

- 9 Spraying Currant Bushes
- 10 Motor Plough
- 11 Morella Cherry Orchard in bloom. Brook Hall Farm
- 12 Morella Cherry Tree

- 13 Picking Cherries
- 14 Picking Strawberries
- 15 Loganberry Plantation
- 16 Picking Loganberries
- 17 Weighing in fruit

BYW**FRUIT CULTURE.**

A Series of 50 Slides.

Coloured Slides, 6s. Plain Slides, 2s.

Full particulars on application.

For Slides on the Sugar Industry, see "Industries," Section 7 of this Catalogue.

BFT**FRUIT FARMING BY NEW ZEALAND METHODS.**

Beautifully Coloured Slides, 6s. each. Plain Slides, 2s. each.

- 1 Table. Distance Apart
- 2 Diagram. Square Method
- 3 " Hexagonal System
- 4 " Square System
- 5 " Planting Board
- 6 " Method of using a planting board
- 7 Heating a small home orchard with fire pots in full blaze
- 8 Red Clover in an orchard to be ploughed under
- 9 Methods of layering Filberts and Cobs
- 10 Right ways of layering strawberries
- 11 Strawberry plant at stage for increasing runners
- 12 Correct cultivation
- 13 Whip or Tongue grafting young trees
- 14 Propagation of young trees. Budding and root grafting
- 15 Trained Apple Tree cut back and grafted
- 16 Rind grafting, etc.
- 17 Double grafting
- 18 Bud properly inserted in stock
- 19 Shield hudding, etc.
- 20 Removing piece of wood from back of bud, etc.
- 21 The objects of pruning
- 22 Apple Tree. 3rd Winter Pruning
- 23 Pruning 1 and 2 year old Apple Trees. Five examples
- 24 Summer pruning of shoots at end of Branches
- 25 Pruning young gooseberry bush
- 26 Typical summer shoots of pear tree, etc., Six examples
- 27 Showing the depth at which cuttings of bush fruits are inserted
- 28 Wood branch Extension

- 29 Bud rightly pinched, etc.
- 30 Method of cutting branches
- 31 Apple Canker
- 32 " Scab
- 33 " Mildew
- 34 " Brown rust
- 35 " rot
- 36 Keep Orchards free
- 37 Apple Oyster Shell Scale
- 38 " Codlin Moth and its work
- 39 " Stages in the formation of sphaeropsis limb cankers
- 40 " Powdery mildew on leaves
- 41 Pear. Leaf. Blister Mite
- 42 " Rust
- 43 " Plum and Cherry Saw Fly
- 44 " Mussel Scale
- 45 Peach. Leaf affected with "Curl"
- 46 Spraying. First Application
- 47 " Second "
- 48 " Third "
- 49 " a tree
- 50 Cultivating
- 51 Irrigating
- 52 A fine young Orchard—well irrigated
- 53 Practical Western Orchard Cultivation
- 54 Lemon Tree
- 55 Orange Ranch
- 56 Seedling Oranges
- 57 Gathering Oranges
- 58 Spring time in an orchard
- 59 Some Ducks in an orchard
- 60 Raspberry Canes Three examples
- 61 North-west special boxes for fruit

B V V FARMING AND FRUIT GROWING UNDER THE SOUTHERN CROSS.

Beautifully Coloured Slides, 7s. 6d. each. Plain Slides, 2s. each.

- | | | |
|--------------------------------------------------|------------------------------------------------|-------------------------------------------------------------|
| 1 Typical Bush | 32 A Bunch of Peaches. | 60 Interior of Freezing Works. |
| 2 Bush Clearing. | 33 Black Grapes. | 61 Mutton. |
| 3 New Settlers. | 34 Pine Apple Field. | 62 Herd of Cattle. |
| 4 A Young Settler. | 35 Fruit Drying Green. | 62 Freezing works. Beef, Killing room. |
| 5 Making a start. Soldier Settler's first home. | 36 Fruit Drying on racks. | 63 Freezing works. Slaughter house. Capacity 5,500 per day. |
| 6 A Happy Family. | 37 Stemming and Grading Machine. | 64 Freezing works. Beef Department. |
| 7 "Ploughing" with Tractor. | 38 River Steamer Loading Dried Fruits. | 65 Freezing works. Tallow House Vats. |
| 8 Wheat stacked. | 39 Honey Grading. | 66 Cooling room in Freezing works. |
| 9 Gathering the Wheat. | 40 Export of Apples. The Store. | 67 Store room for frozen Lamb and Mutton. |
| 10 Threshing Scene. | 41 " " " Hoisting on ships. | 68 Classing wool and Rolling. Fleeces in a Shearing Shed. |
| 11 A Well-to-do Fruit Grower's Home and Orchard. | 42 " " " Stowing in the hold. | 69 Carting Wool. |
| 12 Orchard and House of an Apple Grower. | 43 A Sheep Station. | 70 Delivering Wool at stores. |
| 13 Clearing Land for Orchard. | 44 Sale of Sheep. | 71 Packing Wool into Bales. |
| 14 Making Irrigation Channel. | 45 Types of Sheep. Romney flock. | 72 Wool Stores |
| 15 Ten year old Orchard. | 46 Specimens of Romney flock. | 73 Jersey Milkers |
| 16 Stone Fruit Orchard. | 47 South Down. Ewes and Lambs. | 74 Milking Herd. |
| 17 Orchard (Stone Fruits) among the Mountains. | 48 Dipping Sheep. | 75 Calves on a Dairy Farm. |
| 18 A Fruit Orchard in the plains. | 49 Sheep feeding in Turnip Field. | 76 Typical Dairy Factory. |
| 19 Apricot Orchard. | 50 Shepherds leaving Station for mustering. | 77 Receiving and weighing Milk at a Butter factory. |
| 20 Extensive view of Orchards. | 51 Sheep crossing a stream. | 78 Exterior of up to date Milking Shed. |
| 21 Orchard and Vineyard. | 52 Mustering Sheep on the Plains. | 79 Machine Milking. |
| 22 Apple Orchard. | 53 Mustering Sheep in the Hills. | 80 Testing Milk for butter fat. |
| 23 Fruit growing. | 54 After Mustering, on the way to the station. | 81 Condensing and Pasteurizing Plant. |
| 24 Cherry Orchards. | 55 Drafting Sheep. | 82 Interior of Cheese Factory. |
| 25 Almond Blossoms. | 56 Washed and Sheep yards. | 83 Grading Butter. |
| 26 Spraying Operation in an Orchard. | 57 Shearing in full swing. | |
| 27 Pickers at work in an Orchard. | 58 Wool Shed and Shorn Sheep. | |
| 28 Picking Grapes. | 59 Freezing Works and Sheep. | |
| 29 Grape Picking. | | |
| 30 Strawberry Picking. | | |
| 31 Cherry Trees in bloom. | | |

B K HOPS AND HOP CULTURE.

Photographs from Life.

This interesting Series of Pictures illustrating Hop Cultivation was Photographed at Brencbley by Mr. T. E. Freshwater, F.R.P.S., with the courteous assistance of H. Monson, Esq., of the South-Eastern Agricultural College, Wye, Kent.

Beautifully Painted Views, 6s.; Figures, 10s.; Plain Photographs, 2s. each.

The Plant.

- Hops. Fuggles Goldings
- Fuggles Goldings
- Hops trained on the upright system on Poles (the old method)
- Hops trained on slanting string and horizontal wires

Implements used for Culture

- The Ploughs
- " Hop Washer
- " Sulphurator
- Hoes

Spring and Winter Work.

- Hop Netting put up to shelter the hops
- Alley struck up
- Feeding and pigs making dung
- Washing Hops
- Sulphuring Hops

Arrival of Hop Pickers.

- Huts for the Pickers
- Pickers in experimental plot A
- " " in Plot B
- " " " C
- " " " D
- " " " "

- Children resting
- Dog wat-bing the Poles
- Pole-puller
- Hop Bin
- Measuring Hops out of the Bin
- Tallying Hops
- Weighing Hops from the experimental plot
- Loading Wagon
- Waggons arriving at the Oast House
- Hops put on the Rack ready for next drying
- The old Oast House with open fireplace
- " new " " " " Cookles " furnaces
- Drying, filling, and pressing room in the Oast
- Hop Sample and Mate drawing samples
- Hops being loaded into trucks at the station
- Hop Garden stripped
- Poles stacked
- Hop Garden with permanent poles and wire work

Diseases

- Hop Aphid (green fly) *Aphis humuli*. Pupa at early stage, also showing wing cases, Male Aphid, Female, wingless form
- Red Spider
- Mould
- Insect in fungus

Remedial Substances.

- Quassia. Splitting logs for Quassia chips

[For Slides on " Brewing " see " Industries, " Section 7.]

BP THE LIFE OF THE WHEAT PLANT FROM SEED TO SEED.

Photographed by special permission from a series of diagrams published by the Royal Agricultural Society of England.

Plain Photographs, 2s. each, Descriptive pamphlet, 6d.

- 1 The Structure of the Grain. (1) The grain X 6 times. (2) Embryo of 1 exposed, X 5 times. (3) Section of 1, X 6 times. (4) Transverse section of 1 through endosperm, X 6 times. (5-6) Transverse section of 1 through the Embryo, X 6 times.
- 2 The Structure of the Grain. (7) Section of part of a grain showing the stored gluten and starch, X 120 times. (8) Starch grains, X 120 times.
- 3 Germination of the Grain. (1) Grain sown 5 days, X 4 times. (2) Section of 1, X 6 times. (3) Grain sown 5 days, X 4 times. (4) Section of 3, X 6 times. (5) Grain sown 8 days, X 4 times. (6) Section of 5, X 8 times.
- 4 Germination of the Grain. (7) Section of the leaf and sheath of 5, X 30 times. (8) Section of piece of leaf of 7, X 120 times. (9) Stomates of leaf, X 120 times. (10) Section of root of 5, X 40 times.
- 5 The Young Plant. (1) First leaf emerging, $\frac{1}{2}$ natural size. (2) Figure 1, X 4 times. (3) Section of part of Fig 2, X 6 times. (4) Young plant with a second leaf, $\frac{1}{2}$ natural size. (5) Section of part of Fig. 4, X 6 times.
- 6 The Young Plant. (6) Young plant with 3 leaves. $\frac{1}{2}$ natural size. (7) Part of 5, X 3 times. (8) Section of 7, X 6 times. (9) Section of root with young rootlets, X 40 times.
- 7 Early growth of the Ear. (1) Plant, March 21, $\frac{1}{2}$ natural size. (2) Plant, April 21, $\frac{1}{2}$ natural size. (4) Lower part of 3, X 3 times. (5) Section of 4, X 3 times.
- 8 Early growth of the Ear. (2) Centre of stem of 1, with young ear, X 16 times. (6) Section of stem of 3 with young ear X 16 times. (7) The ear, April 28, X 16 times. (8) The ear, May 5, X 16 times. (9) The ear, May 12, X 16 times.
- 9 Growth of the Ear and Flower. (1) The ear, May 12, X 8 times. (2) The ear, May 26, X 8 times. (3) The ear within its sheath. (4) The ear emerging from sheath, June 16, $\frac{1}{2}$ natural size.
- 10 Growth of the Ear and Flower. (4) Spikelet of 3, X 4 times. (6) Spikelet taken from an ear, June 2, X 4 times. (9) Spikelet of 3, X 4 times.
- 11 Growth of the Ear and Flower. (5) A flower of 4, X 8 times. (7) A flower of 6, X 6 times. (10) A flower of 8, X 8 times. (11) The same flower (10) showing the young grain, X 6 times. (12) Section of Anther of 10, with ripe pollen, X 10 times. (13) Section of young grain of 11, X 10 times.
- 12 The Flower. (1) Ear in flower, June 30, $\frac{1}{2}$ natural size. (2) Another view of 1, $\frac{1}{2}$ natural size. (3) Spikelet of 1, X 2 times. (4) A flower of 3, X 2 times. (5) The same flower (4) without the glume, X 2 times. (6) Section of glume and pale of 4, X 2 times.
- 13 The Flower. (7-8) Flower with lodicules, stamens and style, X 4 times. (9) Section of a lodicule of 7, X 6 times. (10) Transverse section of a burst Anther, X 8 times. (11) Ovary and styles with pollen grains, X 4 times. (12-13) Section of 11, X 8 times. (14) Transverse section of ovary of 11, X 8 times. (15) A hair of the style of 11, X 80 times. (16) Pollen grains, entire, emitting the tubes and empty, X 80 times.
- 14 Ripening of the Grain. (1) Grain, June 23, X 5 times. (2) Embryo of 1 exposed. (3) Section of 1 through the Embryo. (4) Grain, June 25, X 5 times. (5) Embryo of 4 exposed, X 5 times. (6) Section of 4 through the Embryo, X 6 times. (7, 8) Embryo of 4 detached, X 8 times.
- 15 Ripening of the Grain. (9) Nearly ripe grain, X 5 times. (10) Embryo of 9 exposed, X 5 times. (11) Section of 9 through the Embryo. (12) Fully ripe grain, X 5 times. (13) Embryo of 12 exposed X 5 times. (14) Section of 12 through the Embryo, X 5 times. (15) Section of the Embryo of 12, X 5 times.
- 16 The Wheat Straw. (1) The Wheat Plant in flower, $\frac{1}{10}$ natural size. (7) The plant in seed, $\frac{1}{10}$ natural size.
- 17 The Wheat Straw. (2) Portion of the straw of 1, $\frac{1}{10}$ natural size. (3) Section of 2, X 4 times. (4) Section of 2, X 8 times. (5) Section of 3 at the knot, X 8 times. (6) Section of 4, X 80 times. (7) The plant in seed, $\frac{1}{10}$ natural size.

BQ THE LIFE HISTORY OF WHEAT.

Direct Photo-Micrographs, 2s. each.

- | | |
|-------------------------------------------------------|--------------------------------------------------------|
| 1 Wheat Plant Stem. Trans. section, stained | 8 Wheat Plant Starch. Isolated |
| 2 " Long. section of on-half, stained | 9 Smut in Grain of Wheat. <i>Ustilago segetum</i> |
| 3 " Root. Trans. section, stained | 10 Mildew on Stem of Wheat. <i>Puccinia graminis</i> |
| 4 " Leaf " " | 11 Spores of Bunt Fungus in Corn. <i>Uredo foetida</i> |
| 5 " Silicious Cuticle " " | 12 Wheat Stem Fly |
| 6 " Fruit. Long. section of embryo, stained | 13 Eel Blight from Wheat. <i>Fibrio tritici</i> |
| 7 " Plant Fruit. Trans. section of Endosperm, stained | 14 Meal Mites. <i>Tyroglyphus farinus</i> |

For Slides on "Bread Making" and on "London Docks," see "Industries," Section 7

BA AGRICULTURAL BOTANY.

Direct Photo-Micrographs, 2s. each.

- | Roots. | Stems. | Flowers. |
|---------------------------------------------------------------------------------------|----------------------------------|-----------------------------------------------------------------|
| 1 Growing Tip of Root of Barley, long. sect. | 6 Trans. Sect. Stem of Oat. | 13 Trans. Sect. of an Anther. |
| 2 Trans. Sect. Root of Maize, showing root hairs. | 7 " " Bean. | 14 " " of an Ovary of "Potato." |
| 3 Trans. Sect. Root of Maize, showing branching | 8 Long. Sect. Stem of Bean. | |
| 4 Trans. Sect. Root of Turnip, Enlarging | 9 " " a Bud of Lime Tree | |
| 5 Trans. Sect. Stem of Host, showing sucker roots of Dodder <i>Cuscuta Trifolia</i> . | Leaf. | Fruits and Seeds. |
| | 10 Vert. Sect. of Leaf (a) Bean. | 15 Vert. Sect. of a grain of Oat, showing Embryo and Endosperm. |
| | 11 Vert. Sect. of Leaf (b) Oat. | 16 Trans. Sect. of Catyledon of Pea |
| | 12 " " of Leaf (c) Cabbage white | 17 Embryo of Oat, Trans. Sect. |
| | | 18 Seed of sweet Vernal Grass. |

AGRICULTURAL BOTANY—(Continued).

General Structure.

- 19 Long. Sect. Stem Lettuce, to show milk tubes.
- 20 Sect. stem Vegetable Marrow to show sieve plates.
- 21 Epidermis of leaf of grass, to show stomata.
- 22 Stinging hairs of nettles.

- 23 Section of Potato, cells containing starch and cork cells of rind.

uccinia Graminis in Stages.

- 24 (a) Rust.
- 25 (b) Mildew on Stem of Wheat.

- 26 Barberry *Accidium Berberides*.
- 27 Club Root in Turnips, showing enlargement of cells.
- 28 Ergot of Rye, *Claviceps purpurea*.
- 29 Smut of Wheat, *Ustilago Secalis*.
- 30 Potato Disease, Fungus on leaf, *Peroonospora infestans*.

AZ

ELEMENTARY BOTANY.

Copied from Pictures by permission of Messrs. Longmans & Co.

Arranged by F. Timbrell Esq., A.K.C.

Text Books, Thomas' Botany, 4s.; Edmond's Botany, 4s.

Beautifully Painted, 6s.; Plain Photographs, 2s. each.

THE ROOT.

- 1 Varied forms assumed by Root
- 2 Its endogenous nature, its cap and hairs
- 3 Development in a mono, and a dicotyledon
- 4 and 5 T.S. (two) of *Ranunculus acris*, showing the centripetal formation of wood

THE STEM.

- 6 Subterranean and prout forms
- 7 Diagram of dicotyledon
- 8 " " monocotyledon
- 9 T.S. of dicotyledon
- 10 L.S. "
- 11 T.S. of monocotyledon
- 12 " " Dracena, showing formation of new vascular bundles from extra fascicular cambium

THE LEAVES.

- 13 Simple entire
- 14 " " divided } Types of leaves
- 15 Compound
- 16 Particular forms of leaf
- 17 Arrangement of leaves on stem
- 18 T.S. through stomata into intercellular spaces
- 19 Stivation
- 20 Vernation

THE FLOWER.

- 21 Perfect, pistillate, staminate, and neuter flowers
- 22 The floral diagram
- 23 The calyx, various form of
- 24 " " corolla " " "
- 25 " " stamen " " "
- 26 " " pollen " " "
- 27 " " pistil " " "

THE INFLORESCENCE.

- 28 Definite
- 29 Indefinite

SUBSIDIARY ORGANS.

- 30 Hairs, unicellular-multicellular
- 31 Spines, prickles, phylloides, phylloclades

THE FRUIT.

- 32 Indehiscent and diagram to illustrate dehiscent
- 33 Dehiscent
- 34 Development of Arillus of Yew

THE SEED.

- 35 Position of ovule in ovary and embryo in endosperm
- 36 Comparison of mono, and dicotyledon
- 37 Fertilisation of an angiosperm
- 38 " " " a gymnosperm

THE CELL AND VESSEL

- 39 Variety in shape
- 40-41 Thickening of walls
- 42 Special marking on cell walls
- 43 Its contents (A) Chlorophyll; circulation, rotation occurrence in bands
- 44 " " (B) starch Aleurone, *in situ*
- 45 " " (C) Crystals
- 46 Confugation, multiplication, and free cell formation
- 47 Sieve tubes, utricular and laticiferous vessels
- 48 Cells with contents of varying density
- THE TISSUES.
- 49 Parenchyma, proscenchyma, and collenchyma
- 50 Resin passage

UO

BOTANICAL SLIDES.

A series of Photomicrographs. Plain Slides, 2s. each.

- 1 Hop root, transverse section
- 2 Barley Growing tip of root, longitudinal section
- 3 Orchid *Latifolia* Seeds
- 4 Sunflower Root, trans. sect. stained
- 5 Hop stem, trans. sect.
- 6 Bean Plant Stem, one half of an internode, trans. sect.
- 7 Clematis, Section
- 8 Pitcher Plant Stem, trans. sect.
- 9 Gipsywort, trans. sect. [sect.]
- 10 Virginia Creeper, Stem, trans.
- 11 Cycad, Structure of Stem, trans. sect.
- 12 Marechal, Section of Stem
- 13 Allspice Stalk and Leaf
- 14 Date Palm, trans. sect.
- 15 Bamboo Cane, stem
- 16 Rattan Cane *ratang*, trans. sect.
- 17 Palm, trans. sect.
- 18 Hazel, trans. sect. of Branch
- 19 Orange Tree, Stem of, trans. sect.
- 20 Pine, Bastard growth of stem
- 21 Tree Fern, trans. sect. [Stem]
- 22 Spruce Fir, *abeli*, trans. sect. of
- 23 Stem of Elm, structure of Stem, Arborescent Dicotyledon, trans. sect.
- 24 Pine, Structure of Stem, transverse sect. Stem of *Pinus sylvestris*
- 25 Lime Tree, longitudinal and trans. sect.
- 26 Lime Tree, trans. sect.
- 27 Holly Ilex, trans. sect.
- 28 Mulberry, trans. sect.
- 29 Oak, trans. sect.
- 30 Cedar, Section of Wood Pencil
- 31 Rosewood Sections
- 32 Barberry, trans. sect. of Stem
- 33 Aristolochia, trans. sect. of wood
- 34 Lime, Stem of trans. sect. 2 years old
- 35 Mulberry, longitudinal sect.
- 36 Oak, longitudinal sect.
- 37 Passiflora *Cerulia*, trans. sect. of Stem
- 38 Ficus *Serratus*, trans. sect.
- 39 Cycas *Revoluta*
- 40 Daucus *Carota*, trans. sect.
- 41 Hop, Leaf stalk, trans. sect.
- 42 Fern, Structure of Stem, t.s.
- 43 Rhubarb, Spiral fibre Stem of
- 44 Chrysanthemum, trans. sect. young shoot
- 45 Hop Leaf, trans. sect. through midrib
- 46 Male Fern, *Lastria Filix-mas*, trans. sect.
- 47 Brake Fern
- 48 Maiden Hair Fern Pinnule
- 49 Raspberry Leaf, showing the veins
- 50 Ficus *Elastica*, T.S. of leaf showing Cystolith *in situ*
- 51 Fern, Frond of
- 52 Flowers, trans. sect. of Anther
- 53 Sweet Flag Flower, trans. sect., very rare
- 54 Poppy, Flower-bud
- 55 Lilium *Auratum*, Bud, trans. sect. showing various parts *in situ*
- 56 Tulip, Three-celled ovary, trans. sect.
- 57 Tulip, trans. sect. of ovary *Gesneriana*
- 58 Lilium, Ovary of, trans. sect. showing Embryo Sac
- 59 Great Butterfly Orchis, trans. sect. of ovary
- 60 Maple, Flower bud
- 61 Deadly Nightshade, *aconite*
- 62 Cactus Flower and Fruit
- 63 *Hilcanthus annuus*, Bud
- 64 Oats
- 65 Wheat
- 66 Barley
- 67 Pteris *Aquilina*, Rhizome
- 68 " " T.S. of Stem
- 69 Foxglove, T.S. of Ovary
- 70 " " L.S. " [Stem]
- 71 Pepper (*Ribes Nigrum*), T.S. of

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- 1 Slide illustrating the Divisions of the Phanerogamous Plants, Gymnosperms and Angiosperms.

ROOT.

- | | |
|-------------------------------------------------------------------------|--------------------------------------|
| 2 Root Cap (pileorhiza). | 6 Forms of Roots, Fibrous, Nodulose. |
| 3 Root Hairs. | 7 Biennials. |
| 4 Root of Bean and Oats (germinating). | 8 Aerial Roots of Orchids. |
| 5 Modes of Germination as exemplified by Pinus, Date, Mais, Oak, Beech. | 9 Roots of Dahlia, Orchids, &c. |

STEM.

- | | |
|-----------------------------------|---------------------------------|
| 10 Stem of Labiates, &c. | 15 Tendrils. |
| 11 Runners, Stolons. | 15a Tufted Vetch (V. Craggus). |
| 12 Rhizomes (Solomon's seal). | 16 Spines. |
| 13 Tubers. | 17 Prickles and Hairs. |
| 14 Bulbs and Corms. | 17a Fasciated Stem (Cockscomb). |
| 14a Orchid with bulbiferous stem. | |

LEAVES.

- | | |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------|
| 18 Seed Leaves, Radical and Cauline. | 31 Mountain Tri-ternate Leaf of Rue. |
| 19 Evening Primrose, illustrating Foliage Bracts, and Floral Leaves. | 32 Slide exhibiting unequal symmetry of Leaves (Begonia, Elm and Laurel). |
| 20 Simple Entire Leaves (Iris, Plantain, Lilac, Sessile). | 32a Begonia. |
| 21 Simple Petiolate. | 33 Slide showing development of divided Leaves from entire. |
| 22 Lobed Leaves (Sycamore, Maple, Ivy). | 34 Oak. |
| 23 Lobed Leaf compared with Compound Leaf. | 35 Decurrent Leaves and Modifications of Xanthoxylon. |
| 24 Mustard, Dulcamara, Dandelion. | 36 Thistle and Sweet Pea. |
| 25 Palmatisect and Pinnatisect Leaves. | 37 Connate Leaves (Honeysuckle and Claytonia). |
| 26 Pedate Leaf of Helleborus. | 38 Connate Chlora perfoliata. |
| 27 Compound Leaf of Laburnum, Bramble, and Strawberry. | 39 Connate Teasel. |
| 28 Compound Leaf of Orange, Cinquefoil, Potato, Mountain Ash. | 40 Climbing Leaf of Clematis. |
| 29 " Mountain Ash, Pari-pinnate, Impari-pinnate, and Bi-pinnate. | 41 Juniper and Pinus (Leaves of Conifers). |
| 30 " Mountain Ash, Digitate Leaves of Horse-Chestnut and Virginian creeper. | 42 Succulent Leaves of Aloe. |
| | 43 Succulent Euphorbia. |

LEAF AND BRANCH MODIFICATIONS.

- | | |
|--------------------------------------------------------------|----------------------------|
| 44 Asparagus. | 46 Cladodes of Xylophylla. |
| 45 Cladodes of Butcher's Broom and Phyllodes of Grass Vetch. | 46a Cladodes. |

STIPULES.

- | | |
|--------------------------------------------------------------|-----------------------------------------------------------------|
| 47 Leaf Sheath of Heracleum (Spiny Stipules of Robinia). | 50 Slides exhibiting Parenchymatous and Prosenchymatous Tissue. |
| 48 Stipules of Viola, Rose, Meibianthus, Pisum, and Geum. | 51 Bertolonia. |
| 49 Sweet Pea, Lathyrus Aphaca, Pyrus Japonica, and Hawthorn. | 52 Latice Plant. |

INSECTIVOROUS PLANTS (LEAF MODIFICATION).

- | | |
|-----------------------------------------------------------------------------------------|------------------------------------------------------------------|
| 53 Venus Flytrap. | 59 Cactus Spines. |
| 54 Sun Dew (Drosera). | 60 Barberry and Crataegus (Hawthorn). |
| 55 Sarracenia. | 61 Sloe, Hawthorn, Gooseberry, and Rose. |
| 56 Nepenthes (Pitcher Plant). | 62 Tendrils of Pepper and White Bryony, showing leaves modified. |
| 57 Group illustrating various shapes of simple leaves. | 63 Slide exhibiting Phyllotaxis. |
| 58 Group of Raspberry Leaves, exhibiting development of Quinate Leaf from Ternate leaf. | 64 Group of Parasitical Plants. |

ELEMENTARY BOTANICAL SLIDES—Continued.

BRACES.

- | | |
|------------------------------------------------------|-------------------|
| 65 Euphorbia, Compositae, Umbelliferae, and Valonia. | 66 Bougainvillea. |
| | 67 Lime. |

INDEFINITE INFLORESCENCES.

- | | |
|-------------------------------------|-------------------------------------|
| 68 Spike, Plaintain, Wheat, Barley. | 73a Digitalis. |
| 69 Vervain and Rusb. | 73b Honeysuckle. |
| 68a Spike of Orchids. | 74 Panicle, Corymb. |
| 70 Spadix. | 74a Corymb and Corymbose Cyme. |
| 71 Amentum, Strobilus, and Cone. | 75 Panicle, Thyrus, Horse-Chestnut. |
| 72 Capitulum, Hypanthrodium. | 76 Umbel. |
| 72a (Alder, Birch and Pinus.) | 76a Axillary Inflorescences. |
| 72b Section of Hypanthodium. | 76b Herb Paris (terminal infl.). |
| 73 Raceme (3 varieties). | |

DEFINITE INFLORESCENCES.

- | | |
|----------------------------|----------------------------------|
| 77 Cymes (3 varieties). | 79a Inflorescence of Heliotrope. |
| 78 Figwort. | 79b Comfrey. |
| 79 Verticillaster (mixed). | |

FLOWERS.

- | | |
|-------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|
| 80 Hermaphrodite, Staminate, and Pistillate. | 89 Example of Corona. |
| Dichlamydaeous, Monochlamydaeous, and Ach- | 89a Daffodil. |
| 81 lamydaeous Flower. | 90 Rose (double flower) transformation of Stamens. |
| 82 Monoecious and Diaecious Flowers. | 91 Examples of Nectaries. |
| 83 Hypogynous, Perigynous, Epigynous Flowers, illustrating Thalamiflorae, Calyciflorae, Corolliflorae, or Gramopetalae. | 92 Grasses, Sedges, and Rushes. |
| 83a Fuschia (dissected). | 93 Stamens of Erica, Compositae, Leguminosae, Malva, Fumitory Hypericums, Ricinus, and Salvia. |
| 85 Gamnetalous Corollas (4 varieties). | 94 Pollen of Mallow. |
| 85a Panicleaceous Corolla. | 95 Pistil of Lily, Iris, and Enotera. |
| 86 Flower of Monocotyledon (Petaloideum) and Dicotyledon. | 95a Iris. |
| 86a Wind fertilised Flower of Wheat. | 95b Iris (dissected). |
| 87 Slides (2) exhibiting flower adapted for cross fertilisation. | 96 Dimorphic and Trimorphic Flowers. |
| 87a Campanula. | 97 Section of Ovaries showing Placentation Unicellular and Multicellular Ovaries. |
| 87b Garden Nasturtium. | 97a Garden Peas. |
| 87c Fumitory. | 98 Syncarous and Apocarpous Ovaries. |
| 87d Geranium Pratense. | 98a Columbine (flower and fruit). |
| 87e Malva Sylvestris. | 99 Slide exhibiting three forms of ovules. |
| 88 Group of Compositae. | |

DEHISCENT FRUITS.

- | | |
|--------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|
| 100 Various forms of Capsules (Legume, Siliqua, Silicula, Follicle, &c.) | 102 Slide illustrating the three common forms of Dehiscence, Loculicidal, Septicidal, and Septifragal. |
| 100a Rocket (Honesty). | |
| 101 Capsule of Primrose, Viola, Lychnis, Antirrhinum, Poppy. | |

INDEHISCENT FRUITS (SUCCULENT).

- | | |
|----------------------|-------------------------------|
| 103 Drupes, Drupels. | 104a Modification of Berries. |
| 104 Berries. | 105 Sections of Berries. |

DRY INDEHISCENT FRUITS.

- | | |
|----------------------|---------------------------------------------------|
| 105a Schizocarps. | 109 Aril (Nutmegs—whole and dissected.) |
| 106 Cocoa Nut. | 109a Aril Yew. |
| 106a Samaras. | 110 Section of Albuminous and Exalbuminous Seeds. |
| 107 Achenes, Nuts. | |
| 108 Spurious Fruits. | |

MICROSCOPICAL STRUCTURES (ENLARGED).

- | | |
|------------------------------------------------------------------------|------------------------------------------------------------|
| 111 Parenchymatous and Prosenchymatous Tissue. | 116 Stem of Elm, Hollantbus, Hippuris. |
| 112 Laticiferous Tissue. | 117 Rush and Elder. |
| 113 Stomata. | 118 Roots of Bean, Dock, and Pinus. |
| 114 Slide showing stem sections of Pinus, Maize, Dracaena and Bramble. | 119 Stem of Maize and Bramble. |
| 115 Fern Stem. | 120 Slide showing growth after the removal of the Duramen. |

A few extra Slides (which are placed in their proper position and numbered a, b, &c.) have been prepared since the original preparation of this list, which tend to illustrate special points, thus bringing the total number up to 150.

AFO

BOTANICAL

PLANT ORGANS, SPORES, FERTILIZATION, &c.

A new series of Photomicrographs from very carefully prepared specimens, showing the Spores, Cluster Cups, Conceptacles, Sexual Methods of Reproductions, Diatoms, &c.

Plain Slides, 2s. each.

- 1 Dividing nucleus in Pinus. Showing formation of the Nuclear Spindle.
- 2 Dividing nucleus in Pinus. Showing formation of cell plate which eventually forms a cell wall.
- 3 Dividing Nucleus in young Bean Root. T. Sec. of portion of young root of the bean showing Nucleus. Chromatin in filament dividing into V's.
- 4 Diatom: Aulacodiscus Orientalis. All the diatoms are placed in the series as representing plants which reproduce by fission.
- 5 Triceratium Favus.
- 6 Stemonites Enicentum.
- 7 Arachnodiscus Ehrenbergii.
- 8 The same, showing growth of connecting tubes before formation of Zygosporos.
- 9 Same, more highly magnified.
- 10 Spirogyra in Conjugation, showing Zygosporos and spiral filaments.
- 11 The same, showing Zygosporos more highly magnified.
- 12 Vaucheria. Showing the growth of the new plant from the zoospore; also showing the oogonia and antheridia.
- 13 Saprolegnia growing on an Ant's Egg in water. Showing ends of filaments divided off and developing zooids.
- 14 Portion of the same more highly magnified.
- 15 Low power view of same.
- 16 Sexual method of reproduction showing the oospore being fertilised by the clasping antheridia.
- 17 Low power view of the same.
- 18 Reproductive Organs of Chara. Antheridium and young Carpopodium of Chara Fragilis.
- 19 Reproductive Organs of Chara. Same, much older stage, both show the winding cells containing and enclosing the oospore.
- 20 Reproductive Organs of Chara. Same as No. 19.
- 21 Reproductive Organs of Chara. Bust Antheridium of Chara, showing the Manubria with Septate filaments attached containing the coiled antherozoids.
- 22 Male Concep. of Fucus. Section through the Thallus of Fucus showing Male Conceptacle. This shows the filaments as tree-like forms which produce the antherozoids and the orifice by which they escape.
- 23 Male Concep. of Fucus. Filaments highly magnified showing the contained antherozoids.
- 24 Female Concep. of Fucus. Section through Thallus of Fucus showing Female Conceptacle. This shows the Mother cells growing among the paraphyses, some of the former dividing up into daughter cells which form the oospores. The orifice is also shown by which they pass into the water.
- 25 Spores of Fungus (Polyporus). Section of Fungus (Polyporus) showing production of spores on the basidia.
- 26 Cluster Cups. Section through group of Cluster Cups on the Coltsfoot, showing the spores being produced. The mycelium can also be seen in places.
- 27 Apothecium of Lichen. Thallus and Apothecium of Lichen (fo laneous), showing structure of the Thallus and Apothecium or spore-bearing organ.
- 28 Apothecium of Lichen. Section through the Apothecium of foliaceous Lichen showing the spores developing in the asci.
- 29 Antheridia of Liverwort. Section through the Thallus of a Liverwort, showing the male organs, the Antheridia developing in the Antheridial receptacle.
- 30 Archegonia of Liverwort, Marchantia Polymorpha in situ.
- 31 Marchantia Polymorpha. L. Sec. of Receptacle of Marchantia Polymorpha showing the Archegonia in section.
- 32 Spores and Elaters of Marchantia.
- 33 Antheridia of Moss. Long. section through Moss Plant, showing the Antheridia (male organs) in situ.
- 34 Archegonia of Moss. Long. section of Moss Plant, showing Archegonia in situ among the leaves.
- 35 T.S. Capsule of Moss (Polytrichum Commune). Transverse section, showing wall of the capsule, spore sac and columella in section.
- 36 Moss Capsule. Long. section of Capsule of Moss, showing Spore Cavity, Columella, &c.
- 37 Section through Prothallus of Fern, showing Antheridia in different stages of development.
- 38 Archegonia on ditto showing canal and egg cell.
- 39 Sec. through Sori of Fern, showing spore cases with their thickened border, the whole being covered over by the Indusium.
- 40 Fructification of Equisetum. Transverse and Long. Sec. of Sporophyll of Equisetum showing spore cases in situ.
- 41 Spore case of Equisetum. Long. Sec. through spore case of Equisetum showing spores in situ. It also shows extremely well the peculiar thickening of the cell walls of the spore case by means of which the spores are dispersed.
- 42 Spores of Equisetum with the filaments coiled round them.
- 43 Spores of Equisetum with filaments expanded.
- 44 Sporophyll of Lycopodium. Long. Sec. of Sporophyll of Lycopodium (Club Moss), showing spores in situ, also the peculiar structure of the capsule wall where it ruptures at the top.
- 45 Ovuliferous Scale of Larch, showing the structure of the scale, its ovule, and the micropyle.
- 46 Ovuliferous Scale of Pinus. Long. Sec. of cone of Pinus, showing the scales with the Ovules at their base. The Ovules show the micropyle, &c., extremely well.
- 47 Ovule of Hyacinth. Long. Sec. of Ovule of Hyacinth, showing the Egg Cells, Antipodal Cells, and the Embryosac.
- 48 Anther of the Turks Cap Lily. Older stage. Trans. sec. of young Anther of the Turks Cap Lily, showing the Mother cells, dividing to form the Pollen Grains.
- 49 Anther of Turks Cap Lily. Young stage. Trans. sec. of Anther of the Turks Cap Lily, showing the structure of its various parts.
- 50 Long. Sec. of Embryo of Wheat showing all its different parts.

BOTANICAL PLANT ORGANS, SPORES, FERTILIZATION, &c.—Continued.

- 51 Development of Lenticel in the Elder. This section shows the Stomata only before the commencement of Cork formation.
- 52 Development of Lenticel in Elder. Shows the formation of the spongy cells under the Stomata, and also the first beginning of the Cork.
- 53 Fully developed Lenticel on Elder showing its structure and also the rapidly developing Cork layer.
- 54 Leaf Fall Poplar. Long. Sec. through junction of petiole and stem showing the formation of the Absciss layer which causes the leaf to fall.
- 55 Leaf Fall. Trans. Sec. through the Absciss Layer in leaf of Horse Chestnut, which causes the leaf to fall in autumn, showing the corky layer forming.
- 56 Trans. Sec. through Xylem of leaf of Pinus. Section through bordered pit showing the pores and central membrane.
- 57 Long Sec. of Hop Stem with Trans. Sec. of Dodder Stem parasitic thereon. Shows the haustoria from the Dodder which has grown into the Hop Stem. It also shows very beautifully the spiral vessels in the Hop Stem.

AVA STRUCTURAL BOTANY, (FLOWERS).

From carefully-executed diagrams. The various parts are numbered and appear on the slides with the printed descriptions.

Plain Slides, 2s. each.

- | | |
|---------------------------------------------|--------------------------------------------------|
| 1 Berberis vulgaris. | 11 Achillea millefolium and Chrysanth: leucanth: |
| 2 Cardamine pratensis. | 12 Cnicus arvensis. |
| 3 Viola carcarata. | 13 Hieracium umbellatum and H: pilosella. |
| 4 Dianthus deltoides. | 14 Campanula pusilla. |
| 5 Stellaria graminea. | 15 Erica tetralix. |
| 6 Malva silvestris, &c. (essential organs). | 16 Veronica chamaedrys. |
| 7 Erodium cicutarium. | 17 Digitalis purpurea. |
| 8 Sarrothamnus scoparius. | 18 Euphrasia officinalis. |
| 9 Parnassia palustris. | 19 Pedicularis sylvatica. |
| 10 Anthriscus silvestris. | |

UP "THE HERB YIELDING SEED AND THE TREE YIELDING FRUIT."

A Popular Exposition of Plant Life and Growth. Illustrated by Nature.

This Series was arranged and the Lecture written by F. TIMBRELL.

Descriptive Lecture, 1s. 8d.; Plain Slides, 2s. each.

- | | | |
|---------------------------------------------------|-------------------------------------------|----------------------------|
| 1 Root of Sunflower. Branching | 18 Stem of Hazel T.S. Formation of wood | 34 Stomata |
| 2 Potato. Cork and Starch Cells | 19 " Elder. Pith T.S. Formation of wood | 35 Water Stomata |
| 3 Cork Cells | 20 " Hop T.S. Formation of wood | 36 Leaf of Sundew |
| 4 Root of Maize. Root Hairs. | 21 " Rattan T.S. Formation of wood | 37 Pitcher Plant |
| 5 Root of Barley. Growing Tip | 22 " Lime V. and T.S. Formation of wood | 38 Spathe of Arum |
| 6 Duck-weed. Root Cap | 23 Shoot of Lime V.S. Leaf arrangement | 39 Bud of Lily T.S. |
| 7 Sucker Roots of Dodder on Clover | 24 Bud of Lily T.S. Leaf arrangement | 40 " Poppy V.S. |
| 8 Stem of Elm, T.S. Formation of wood | 25 Stem of Deadnettle. Leaf arrangement | 41 Stamen T.S. |
| 9 " Bamboo T.S. Formation of wood | 26 Branch of Elm. Leaf arrangement | 42 Poppy Head |
| 10 " Tree Fern T.S. Formation of wood | 27 Branch of Oak. Leaf arrangement | 43 " T.S. |
| 11 Scalariform Cells of Fern. Formation of wood | 28 Leaf of Lime. Leaf veining | 44 Bloom of Hydrangea |
| 12 Stem of Butcher's Broom T.S. Formation of wood | 29 " Lily of Valley " | 45 " Fuchsia |
| 13 " Male Fern T.S. Formation of wood | 30 " Hart's Tongue " | 46 American Poplar |
| 14 " Bracken T.S. Formation of wood | 31 Leaf Stalk of Hop T.S. | 47 Black " |
| 15 " Buttercup T.S. Formation of wood | 32 " Blade " T.S. | 48 Maple " |
| 16 " Bean T.S. Formation of wood | 33 " of Indiarubbe T.S. Cystolith in situ | 49 Pollen Grains |
| 17 " Orange T.S. Formation of wood | | 50 " Germinating |
| | | 51 Ovary of Lily T.S. |
| | | 52 Sori of Fern |
| | | 53 Prothallus |
| | | 54 Ferns Germinating |
| | | 55 Cluster of Blackberries |
| | | 56 " Hawthorn |
| | | 57 Hooked Fruit of Burdock |
| | | 58 Winged " Maple |
| | | 59 Feathered " Thistle |
| | | 60 Pods of Laburnum |

See also an excellent lecture on "Trees, their forms and branching," page 231.

NOTE.—When ordering Slides the Telegraphic Code Letters should be quoted to avoid mistakes.

R N THE PRINCIPLES OF HORTICULTURE.

These Slides are photographed from the original drawings made for "The Principles of Horticulture" (by WILFRED MARK WEBB, F.L.S., &c., 2s. net. BLACKIE AND SON), and are admirably suited for giving a series of practical lessons in Botany.

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- 1 Diagram of Privet Leaf, illustrating method of labelling drawings.
- 2 Cress Seedling grown on blotting paper, to show Root-hairs.
- 3 Stem-hairs of Groundsel.
- 4 Chief parts of a Green Plant, and their functions.
- 5 Tissues in stem of Elder.
- 6 Old Stem of Vegetable Marrow, trans. section.
- 7 Old Thickened Root of Vegetable Marrow, trans. section.
- 8 Soft Bast of Vegetable Marrow, long section to show Sieve Tubes.
- 9 A Cell showing Vacuoles.
- 10 The Formation of a Wood Vessel.
- 11 Fruit of the Sycamore.
- 12 Half Fruit of Sycamore, opened to show Seed.
- 13 Contents of a Sycamore Seed.
- 14 Seed of Scarlet Runner, exterior view.
- 15 Seed of Scarlet Runner, dissected.
- 16 Embryo (Young Plant in a Seed).
- 17 Annotated Diagram, illustrating joint action of Root, Leaf and Stem.
- 18 Vegetable Marrow, enlarged Unthickened Root, plan of trans. section.
- 19 Vegetable Marrow, Thickening Root, 1st stage.
- 20 Vegetable Marrow, Thickening Root, 2nd stage.
- 21 Vegetable Marrow, Young Thickened Root, enlarged plan of trans. section.
- 22 Young Branching Root of Stinging Nettle, as seen under the Microscope by Transmitted light.
- 23 Flower-stalk of Arum, trans. section.
- 24 Bud of Brussels Sprout, surface view of cut stem.
- 25 Bud of Brussels Sprout, long section.
- 26 Plan, showing arrangement of leaves in four rows, with $\frac{1}{2}$ circle (90 degs.) between them.
- 27 Plan, showing arrangement of leaves in two rows, with $\frac{1}{2}$ circle (180 degs.) between them.
- 28 Plan, showing arrangement of leaves in three rows, with $\frac{1}{2}$ circle (120 degs.) between them.
- 29 Plan, showing arrangement of leaves in five rows $\frac{1}{2}$ circle (144 degs.) between them.
- 30 Leaf of Dock, dorsi-ventral type.
- 31 Leaf of Iris, iso-bilateral type.
- 32 Leaf of Stone-Crop, centric type.
- 33 Leaf of Clover, Compound, with Palmate Leaf-lets.
- 34 Pinnate Leaf of Rose, Compound, with Leaf-lets.
- 35 Leaf and Stem of Cock's-foot Grass.
- 36 Leaf of Winter Hellebore, trans. section.
- 37 Plan of the Base of an Herbaceous Cutting. (Pelargonium) as seen in a long section.
- 38 Mycorrhiza (fungal mycelium) on Roots of Rhododendron.
- 39 Plan of Base of a Woody Cutting (Red Currant) as seen in a long section.
- 40 Plan of two Stems, with Side Wounds in Process of Healing, as seen in cross-section.
- 41 Plan of a recently made Graft, as seen in a cross-section.
- 42 Plan of a Graft, after a year's Growth has been made, as seen in a cross-section.
- 43 Section of the Root-Graft of Clematis, Wedge-shaped piece of stem, inserted into a length of root.
- 44 Life History of a Fern.
- 45 Life History of Slime Fungus of Club Root (*Plasmodiophora*).
- 46 Life History of Fungus, causing Potato Disease.
- 47 Mushroom Spores, highly magnified.
- 48 Diagram of a Flower (*Echevaria*) and its parts Essential and Non-Essential.
- 49 Fertilization of Plant Egg, and Growth of Embryo.
- 50 Seed of Vegetable Marrow, ext. view, showing Micropyle at lower left-hand corner.
- 51 Seed of Vegetable Marrow, dissected, Seed-coats removed, one side, displaying the Radicle and one Seed-leaf removed from Embryo to show Plumule and veined face of second leaf.
- 52 Seed Leaf removed from specimen shown in last figure with the Termen, or inner seed-coat still adhering to it.
- 53 A Seedling of White Bryony at a stage when the Seed-leaves have not freed themselves from the seed-coats.
- 54 A Seedling of White Bryony, showing the Plumule developing between the expanded seed-leaves.
- 55 Plumule, Radicle, and the one seed-leaf of the Pea Embryo.
- 56 Germinating Pea, showing elongated Radicle, and Plumule arising from between seed-leaves.
- 57 Germinating Pea at later stage, when leaves of Plumule are beginning to expand.
- 58 Fruit of Ash, dissected to show Seed and Embryo within, lying in Endosperm.
- 59 Grain (fruit) of Wheat, split so as to show Embryo lying in pouch at side of the Endosperm.
- 60 Classification of True Fruits; succulent and dry.
- 61 The parts of an Insect (Rose Chafer) *The Metamorphoses of a Moth*.
- 62 Gooseberry Moth. Eggs.
- 63 Gooseberry Moth. Caterpillar (Larva).
- 64 Gooseberry Moth. Chrysalis (Pupa).
- 65 Gooseberry Moth. Moth (Imago).
- 66 A Red "Spider"—one of the Mites.
- 67 An Aphid—one of the Rhynchotha.
- 68 A Cabbage White Butterfly—one of the Lepidoptera.
- 69 A Cockchafer (Beetle)—one of the Coleoptera.
- 70 A Daddy Long-legs (Two-winged Fly)—one of the Diptera.
- 71 A Gooseberry Sawfly—one of the Hymenoptera.
- 72 Dry Seed of Cress, showing ridge corresponding to Radicle within.
- 73 Moistened Seed of Cress surrounded by its swollen seed-coat.
- 74 Cress Seedling showing Radicle, Root-hairs, and seed-leaves, not yet freed from seed-coat.
- 75 Cress Seedling before lobes of seed-leaves are quite expanded.
- 76 Cress Seedling, showing Plumule, with seed-leaves expanded ready to work.

NOTE.—When ordering Slides the Telegraphic Code Letters should be quoted to avoid mistakes.

ABQ ORCHIDS AND WILD FLOWERS

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- | | | |
|-----------------------------------------------------------|-------------------------------------------------------------|--------------------------------------------------------|
| 1 <i>Angracum Eichlerianum</i> . | 29 Fragrant Orchis, <i>Gymna-</i> | 50 Marsh Orchis, <i>Orchis Lati-</i> |
| 2 Autumnal Lady's Tresses,
<i>Spiranthes Autumn-</i> | <i>densa</i> Conopsea, | <i>folia</i> , x 3. |
| <i>alis</i> , whole plant. | " x 1. | 51 " x 3, before and after |
| 3 " x 1. | 31 " x 3. | fertilisation. |
| 4 " x 4. | 32 " x 4, before and after | 52 Green-winged Meadow |
| 5 Bee Orchis, <i>Ophrys Api-</i> | pollination. | Orchis, <i>Orchis</i> |
| <i>fera</i> , x 1. | 33 Musk-scented Orchis, <i>Her-</i> | <i>Morio</i> , x 1. |
| 6 " x 1, in situ. | <i>minium Monorchis</i> , x 4. | 53 " x 1, head of flowers. |
| 7 " x 4. | 34 Frog Orchis, <i>Habenaria</i> | 54 " x 4. |
| 8 Bird's-nest Orchid, <i>Neottia</i> | <i>viridis</i> , x 1. | 55 " x 1. |
| <i>Nidus-Avis</i> , x 1. | 35 " x 1. | 56 Musk Orchis, <i>Herminium</i> |
| 9 " x 1. | 36a " x 1. | <i>Monorchis</i> , x 1. |
| 10 " x 4. | 36 " x 3. | 57a " x 1. |
| 11 " x 4. | 37 Marsh Helleborine, <i>Epipac-</i> | 58 Pyramidal Orchis, <i>Orchis</i> |
| 12 Great Butterfly Orchis,
<i>Habenaria Chlor-</i> | <i>tis Palustris</i> , x 1. | <i>Pyramidalis</i> , x 1. |
| <i>antha</i> , x 1. | 37a " " x 1. | 59 " x 1, whole head of |
| 13 " x 1. | 37b " " x 4. | flowers. |
| 14 Lesser Butterfly Orchis,
<i>Habenaria Bifolia</i> . | 38 Purple Helleborine, <i>Cepha-</i> | 60 " x 4, whole head of |
| 15 " x 1. | <i>lanthera Rubra</i> , | flowers. |
| 16 " x 4. | x 1. | 60a Spider Orchis, <i>Ophrys</i> |
| 17 " x 4, before and after | 39 " x 4. | <i>Aranifera</i> , x 1. |
| pollination. | 40 Large White Helleborine, <i>Ce-</i> | 60b " x 4. |
| 18 Small White Butterfly | <i>phalanthera Pal-</i> | 61 Spotted Orchis, <i>Orchis Ma-</i> |
| Orchis, <i>Habenaria</i> | <i>lens</i> , x 1. | <i>culata</i> , x 1. |
| <i>Albida</i> , x 1. | 41 " x 1. | 62 " x 3. |
| 19 " x 1. | 42 " x 1. | 63 " Fertilisation, 1 |
| 20 " x 1. | 43 Broad-leaved Helleborine, | 64 " " 2. |
| 21 " x 4. | <i>Epipactis Lati-</i> | 65 " " 3. |
| 22 <i>Dendrobium Bensoni</i> . | <i>folia</i> , x 1. | 66 " " 4. |
| 23 Dwarf Orchis, <i>Orchis Ustu-</i> | 44 " x 1. | 67 " " 5. |
| <i>lata</i> , x 1. | 45 " x 4. | 68 Early Purple Orchis, <i>Orchis</i> . |
| 24 Dwarf Dark-winged Orchis,
<i>Orchis Ustilata</i> . | 46 <i>Lipostachys Ferepata</i> | <i>Mascula</i> , x 1. |
| 25 Fly Orchis, <i>Ophrys Mu-</i> | (W. Africa), x 1. | 69 " x 4. |
| <i>cifera</i> . | 47 Lady's Slipper Orchid,
<i>Cypripedium Calceolus</i> , | 70 Common Twayblade, <i>Lis-</i> |
| 26 " x 2. | x 1. | <i>tera Ovata</i> , x 1. |
| 27 Fly Orchis, <i>Ophrys Mu-</i> | 47a " x 1. | 71 " x 1. |
| <i>cifera</i> , x 4, before and after pollina- | 47b Lady's Tresses, <i>Spiranthes</i> | 72 " x 3. |
| tion. | <i>Antimalia</i> , x 1. | 73 " x 1, whole plant. |
| 28 " x 5. | 48 Marsh Orchis, <i>Orchis Lati-</i> | 74 Heart-leaved Twayblade,
<i>Litorea Cordata</i> , |
| | <i>folia</i> , x 1. | x 1. |
| | 49 " x 1. | 75 " x 4. |
| | | 76 <i>Bulbophyllum Barbige-</i> |
| | | <i>rum</i> , x 3. |

See also page 226.

PLANTS, &c.

- | | | |
|---------------------------------------|----------------------------------------|------------------------------------------|
| 77 Water Aconite, <i>Eranthis</i> | 93 Bluebell, <i>Scilla Nutans</i> , | 109 Cowslip, <i>Primula Veris</i> . |
| <i>Hyemalis</i> . | x 1. | 109 Mountain Crane's-bill, |
| 78 " x 1. | 94 Common Borage, <i>Borago</i> | <i>Geranium Pyrenaicum</i> . |
| 79 Hemp-Agrimony, <i>Eupa-</i> | <i>Officinalis</i> . | 110 Shining Crane's-bill, <i>Gerani-</i> |
| <i>torium Cannabinum</i> . | 95 Brooklime, <i>Veronica Becca-</i> | <i>um Lucidum</i> . |
| 80 Alkanet, <i>Anchusa Offici-</i> | <i>buga</i> . | 111 Crosswort or Mugwort, |
| <i>alis</i> . | 96 Butcher's Broom, <i>Ruscus</i> | <i>Galium Cruciale</i> . |
| 81 Wood Anemone, <i>Anemone</i> | <i>Aculeatus</i> . | 112 Bulbous Crow's-foot, <i>Ranun-</i> |
| <i>Nemorosa</i> , x 2. | 97 Unbranched Bur-reed, | <i>culus Bulbosus</i> . |
| 82 Pasque Flower, <i>Anemone</i> | <i>Sparganium Simplex</i> . | 113 Water Crow's-foot, <i>Ranun-</i> |
| <i>Pulsatilla</i> . | 98 Celery-leaved Buttercup, | <i>culus Aquatilis</i> . |
| 83 " x 1. | <i>Ranunculus Sceleratus</i> . | 114 " x 1. |
| 84 Wild Angelica, <i>Angelica</i> | 99 White Campion, <i>Lychnis</i> | 115 Daffodil, <i>Narcissus Pseudo-</i> |
| <i>ylvestris</i> . | <i>Vespertina</i> , x 1. | <i>Narcissus</i> . |
| 85 Water Avena, <i>Geum Riviale</i> . | 100 Celandine, <i>Chelidonium</i> | 116 Dandelion, <i>Taraxacum</i> |
| 86 Common Barberry, <i>Berberis</i> | <i>Majus</i> , x 1. | <i>Densleoni</i> . |
| <i>virearis</i> . | 101 Common Centaury, <i>Ery-</i> | 117 Common Elder, <i>Sambucus</i> |
| 87 Wood Betony, <i>Stachys Be-</i> | <i>thraea Centaureum</i> . | <i>Niger</i> , x 1. |
| <i>nica</i> , x 1. | 102 Chicory, <i>Cichorium Intybu-</i> | 118 Dwarf Elder or Danewort, |
| 88 Bilberry or Whortleberry, | 103 Chives, <i>Allium Schoeno-</i> | <i>Sambucus Edulis</i> , x 1. |
| <i>vacinum Myrtillus</i> . | <i>prazum</i> . | 119 Mountain Everlasting, <i>Ant-</i> |
| 89 Common Bird's-foot, <i>Orni-</i> | 104 Strawberry-leaved Cinque- | <i>ennaria Dioica</i> . |
| <i>thys Perfoliatus</i> . | foil, <i>Potentilla Fragari-</i> | 120 Ferns, Bracken, and Hart's |
| 90 Yellow Bird's-nest, <i>Mono-</i> | <i>astrum</i> . | toogoe, <i>Pteris</i> and <i>Scolo-</i> |
| <i>tropa Hydropitys</i> , Var | 105 Common Cotton-grass, <i>Erio-</i> | <i>pendrium</i> . |
| <i>Hirtuta</i> (Roth). | <i>phorum Polystachyon</i> . | 121 Ivy-leaved Toad-Flax, |
| 91 Common Bistort, <i>Polygonum</i> | 106 Yellow Corydalis, <i>Corydalis</i> | <i>Linaria Cymbalaria</i> . |
| <i>Ristoria</i> . | <i>Lutea</i> , x 1. | 122 Fleabane, <i>Pulicaria Dysen-</i> |
| 92 Hairy Bitter-cress, <i>Carda-</i> | 107 White Climbing Corydalis, | <i>terica</i> . |
| <i>mine Hirtuta</i> . | <i>Corydalis Claviculata</i> . | 123 Furze or Gorse, <i>Ulex Euro-</i> |
| | | <i>paut</i> . |

ORCHIDS AND WILD FLOWERS—(Continued.)

ORCHIDS.

- | | | |
|-----------------------------------------------------------|-----------------------------------------------------|---------------------------------------------------------|
| 238 Frog Orchid, <i>Habenaria viridis</i> | 243 Heart-leaved Tway-blade, <i>Listera cordata</i> | 247 Bird's Nest Orchid, <i>Neotia nidus-avis</i> |
| 239 Bee Orchis, <i>Ophrys apifera</i> | 244 Man Orchis, <i>Aceras anthropophora</i> | 248 Man Orchis, <i>Aceras anthropophora</i> |
| 240 Marsh Helleborine, <i>Epipactis palustris</i> | 245 The Spotted Orchis, <i>Orchis maculata</i> | 249 Man Orchis, <i>Aceras anthropophora</i> |
| 241 Autumnal Lady's Tresses, <i>Spiranthes autumnalis</i> | 246 Lady's Tresses, <i>Spiranthes autumnalis</i> | 250 Lady's Slipper Orchid, <i>Cypripedium calceolus</i> |
| 242 The Coral Root, <i>Corallorrhiza innata</i> | | |

WILD FLOWERS.

- | | | |
|---------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------|
| 251 Water Pepper, <i>Polygonum hydropiper</i> | 290 The Hard Fern, <i>Blechnum spicant</i> | 307 Bird's-foot Trefoil, <i>Lotus corniculatus</i> |
| 252 Sheep's Scabious, <i>Fasione montana</i> | 291 Field Forget-me-not, <i>Myosotis arvensis</i> | 308 Aster (Michaelmas Daisy) |
| 253 The Daisy, <i>Bellis perennis</i> | 292 Field Pansy, <i>Viola tricolor</i> | 309 Wood Anemone, <i>Anemone nemorosa</i> |
| 254 Traveller's Joy, <i>Clematis vitalba</i> | 293 Wood Sage, <i>Teucrium Scordonia</i> | 310 Snake's Head, <i>Fritillaria meleagris</i> |
| 255 Gelder Rose, <i>Viburnum opulus</i> | 294 Shepherd's Purse, <i>Capsella bursa-pastoris</i> | 311 Common Cotton Grass, <i>Eriophorum polystachyon</i> |
| 256 Greater Stitchwort, <i>Stellaria holostia</i> | 295 Great Burdock, <i>Arctium Lappa</i> | 312 Common Tansy, <i>Tanacetum vulgare</i> |
| 257 Woodruff, <i>Asperula odorata</i> | 296 Corn Marigold, <i>Chrysanthemum segetum</i> | 313 Cuckoo pint (In section, magnified), <i>Arum maculatum</i> |
| 258 The Moschatel, <i>Adoxa Moschatellina</i> | 297 Groundsel, <i>Senecio vulgaris</i> | 314 Tuberous Bitter Vetch, <i>Lathyrus macrorrhizus</i> |
| 259 Arrow-grass, <i>Triglochin maritimum</i> | 298 Field Convolvulus, <i>Convolvulus arvensis</i> | 315 Wayfaring Tree, <i>Viburnum Lantana</i> |
| 260 The Autumnal Squill, <i>Scilla autumnalis</i> | 299 Cromwell, <i>Lithospermum officinale</i> | 316 Wild Red Currant, <i>Ribes rubrum</i> |
| 261 Spiny reed Harrow, <i>Ononis spinosa</i> | 300 Marsh Forget-me-not, <i>Myosotis palustris</i> | 317 Common Spurge Laurel, <i>Daphne Laureola</i> |
| 262 Navelwort, <i>Cotyledon Umbelicus</i> | 301 Devil's Bit Scabious, <i>Scabiosa succisa</i> | 318 Sea-hlight, <i>Suaeda maritima</i> |
| 263 The Coltsfoot, <i>Tussilago Farfara</i> | 302 Cross-leaved Heath, <i>Erica tetralix</i> | 319 Lady's Smock, <i>Cardamine pratensis</i> |
| 264 Marsh Gentian, <i>Gentiana Pneumonanthe</i> | 303 Sea Wormwood, <i>Artemisia maritima</i> | 320 The Oak, <i>Quercus robur</i> |
| 265 The Ciliated Heath, <i>Erica citraris</i> | 304 Lady's Mantle, <i>Alchemilla vulgaris</i> | 321 Mountain Bladder Fern, <i>Cystopteris montana</i> |
| 266 Ohioc, <i>Obione Portulacoides</i> | 305 Branched Bur-reed, <i>Sparganium ramosum</i> | 322 Grass of Parnassus, <i>Parnassia palustris</i> |
| 267 Herb Paris, <i>Paris quadrifolia</i> | 306 Male Flowers of Moss, <i>Polypodium juniperinum</i> | 323 Callatrich, <i>Callatrich palustris</i> |
| 268 Agrimony, <i>Agrimonia Eupatorium</i> | 307 Wormwood, <i>Artemisia Absinthium</i> | 324 Marsh Wort, <i>Apium nodiflorum</i> |
| 269 The Bugle, <i>Ajuga reptans</i> | 308 Red Foxglove, <i>Digitalis purpurea</i> | 325 Hedge Parsley, <i>Caucalis Antirrhoeus</i> |
| 270 The Skull Cap, <i>Scutellaria galericulata</i> | 309 Portland Spurge, <i>Euphorbia Portulandica</i> | 326 Columbine, <i>Aquilegia vulgaris</i> |
| 271 Dutch Clover, <i>Trifolium repens</i> | 300 Lungwort, <i>Pulmonaria officinalis</i> | 327 Pitcher Plant Leaves, <i>Nepenthes Mastersiana</i> |
| 272 Red Bartsia, <i>Bartsia Odontites</i> | 301 Sea Knotgrass, <i>Polygonum Maritimum</i> | 328 Coral-wort, <i>Dentaria bulbifera</i> |
| 273 Masterwort, <i>Astrantia major</i> | 302 Fir Club Moss, <i>Lycopodium Selago</i> | 329 Scarlet Pimpernel, <i>Anagallis arvensis</i> |
| 274 Wild Marjorum, <i>Origanum vulgare</i> | 303 Creeping St. John's Wort, <i>Hypericum humifusum</i> | 330 The Penny-royal, <i>Mentha pulegium</i> |
| 275 Adder's Tongue, <i>Ophioglossum vulgatum</i> | 304 Sea Aster, <i>Aster Tripolium</i> | 331 The Great Dodder, <i>Cuscuta europaea</i> |
| 276 White Stonecrop, <i>Sedum album</i> | 305 Cuckoo-pint (in section), <i>Arum maculatum</i> | 332 Biting Yellow Stonecrop, <i>Sedum acre</i> |
| 277 Tasteless Mountain Stonecrop, <i>Sedum saxatile</i> | 306 The Common Valerian, <i>Valeriana officinalis</i> | 333 Chalk Milkwort, <i>Polygala austriaca</i> |
| 278 Enchanter's Nightshade, <i>Circea lutetiana</i> | | |
| 279 Plants of a Marsh | | |

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| 7 Butcher's Broom. | 17 Furze. | 27 Ragged Robin. |
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| 9 Cuckoo Pint. | 19 The Primrose. | 29 The Spotted Orchis. |
| 10 Stitchwort. | 20 Wood Sorrel. | |

WILD FLOWERS OF THE ENGLISH COUNTRYSIDE.—Continued.

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|-------------------------------|----------------------------|--------------------------|
| 30 Twayblade. | 39 Large Butterfly Orchis. | 47 Yellow Water Lily. |
| 31 Wild Strawberry. | 40 Meadow Sweet. | 48 White Water Lily. |
| 32 Honeysuckle. | 41 Rose Bay Willow Herb or | 49 Bird's Foot Trefoil. |
| 33 Agrimony. | French Willow. | 50 Yellow Toadflax. |
| 34 Foxglove. | 42 Centaury. | 51 Bird's Nest Orchis. |
| 35 Common Mallow. | 43 Ragwort. | 52 Devil's Bit Scabious. |
| 36 Wild Rose. | 44 Heather. | 53 Field Thistle. |
| 37 Dog Daisy, Moon Daisy, Ox- | 45 Cross Leaved Heath. | 54 Sea Holly. |
| Eye Daisy or Marguerite. | 46 Harebell. | 55 Spear Thistle. |
| 38 Wild Pansy. | | |

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|-----------------------------------------|-----------------------------------|---------------------------------|
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| 2 Azaleas, Wreath of, with motto | Azalea | 47 Gilla Diobotoma |
| "WELCOME" | 24 Orchid | 48 Nicotiana Sylvestris |
| 3 " arranged in Vase | 25 Primroses | 49 Pampas Grass |
| 4 " Freesia, and White | 26 " Chinese | 50 Large Flowering Pentstemon |
| Roman Hyacinth | 27 Primula | 51 Dwarf White Pearl Petunia |
| 5 " Narcissi and Freesia | 28 " Coloured | 52 Gem Pinks Drummandii |
| Cineraria | 29 " arranged in Bow | 53 Superb Double Pink |
| 6 " arranged in Bowl | 30 Roses | 54 Double Giant Poppy |
| 7 " arranged in Vase | 31 Snowdrops | 55 White Star Primula |
| 8 " arranged in Vase | 32 Tulips | 56 Mont Blano Star Primula |
| 9 " arranged in a tall Vase | 33 " in Vase | 57 Large Flowered Salpiglossis |
| 10 Cyclamen | | 58 Stachel Incana. Silver Cloud |
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| Roman Hyacinth | by the kind permission of | 60 Chamaepeuce Diantha (Fish |
| 12 Dahlias in Vase | MESSRS. SUTTON AND SONS, | Bone Thistle) |
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| 14 White Roman Hyacinth | 34 Superb Achimenes | 62 Double Zinnia |
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| 17a Lilium Auratum | 37 Antirrhinum | MESSRS. CANNELL & SONS. |
| 18 Narcissi, Wreath of, with | 38 Snowball Aster | 63 Cineraria |
| motto "Interval" | 39 Cantabury Bells | 64 " " |
| 19 Narcissi | 40 Pure White Marguerite Carna- | 65 " " |
| " and Azalea | tion | 66 " " |
| 20 " Lilies of the Valley, | 41 Double Salmon Clarkia Carna- | 67 " " |
| and Tritelia | tion | 68 Primula |
| 21 " and Polyanthus | 42 Convolvulus Major | 69 Primulas |
| 22 " and Primulas | 43 Michaelmas Daisy | 70 New Cactus Dahlia |
| Primula Tulip, and | 44 Delphinium Hybridum | 71 Daisies open (day) |
| Azalea. | 45 Brilliant Fringed Dianthus | 72 " closed (night) |

- 73 A Cluster of Primroses.
74 Lilies.
75 Wild Rose.
76 May.
77 Lilac.
78 Morella Cherries.
79 White Horse Chestnut.
80 Quince.
81 Plum.
82 Cherry.
83 Pear.
84 Almond.

- 85 Willow or Palm.
86 Mistletoe.
87 Sweet William.
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SUTTON AND SONS, Reading.
88 View of the Trial Seed Grounds
taken from the Air.
89 Flower Seed Stockroom.
90 Farm Seed Order Room.
91 Grass and Clover Seed Testing
Laboratory.

- 92 Grass and Clover Seed Clean-
ing Machinery.
93 Interior of Laboratory at
Plant Breeding and Re-
search Station.
94 Seed Potato riddle.
95 Hand picking. Peas and
Beans.
96 Cinerarias in Pavilion at
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A B R

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| 3 Yellow Anemone. <i>Anemone Sulifera</i> . | 10 Long-spurred Pansy. <i>Viola Calcarata</i> . | 17 Mountain Avens, x $\frac{1}{2}$. <i>Geum Montanum</i> . |
| 4 The Spring Anemone. <i>Anemone Vernalis</i> . | 11 Wood-Pink. <i>Dianthus Sylvestris</i> . Wulf. | 18 Cobweb House-leek. <i>Sem-pervivum Arachnoideum</i> . |
| 5 Pyrenean Crowfoot. <i>Ranunculus Pyrenaeus</i> . | 12 Moss Campion. <i>Silene Acanthis</i> . | 19 Mountain House-leek. <i>Sem-pervivum Montanum</i> . |
| 6 Aconite-leaved Crowfoot. <i>Ranunculus Aconitifolius</i> . | 13 Wood Crane's-bill. <i>Geranium Sylvaticum</i> . | 20 Purple Saxifrage. <i>Saxifraga Oppositifolia</i> . |
| 7 Alpine Crowfoot. <i>Ranunculus Alpestris</i> . | 14 Alpine Clover. <i>Trifolium Alpinum</i> . | 21 White Mountain Saxifrage. <i>Saxifraga Aizoon</i> . |

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- 22 Yellow Mountain Saxifrage. *Saxifraga aizoides*.
 23 Rough Saxifrage. *Saxifraga aspera*.
 24 Furrowed Saxifrage. *Saxifraga exarata*. Vill.
 25 Large Astrantia. *Astrantia major*.
 26 Alpine Coltsfoot. *Homogyne alpina*.
 27 Mountain Everlasting, or Cat's-foot. *Antennaria dioica*. Gärtn.
 28 Musk Milfoil. *Achillea moschata*. Wulf.
 29 Glacial Aronic. *Aronicum glaciale*. Rchb.
 30 Arnica. *Arnica montana*.
 31 Spiked Rampion. *Phyteuma spicatum*.
 32 Scheuchzer's Bell-flower. *Campanula scheuchzeri*. Vill.
 33 Red Whortleberry or Cowberry. *Vaccinium vitis idæa*.
 34 Hairy-leaved Alpenrose. *Rhododendron hirsutum*.
 35 Rusty-leaved Alpenrose. *Rhododendron ferrugineum*.
 36 Yellow Gentian. *Gentiana lutea*.
 37 Stemless Gentian. *Gentiana acaulis*. Greml.
 38 Short-leaved Gentian, x ♀. *Gentiana brachyphylla*. Frol.
 39 Alpine Forget-me-not, x ♀. *Myosotis alpestris*. Schmidt.
 40 Alpine Toad-Flax. *Linaria alpina*. Mill.
 41 Rock Speedwell. *Veronica saxatilis*. Jacq.
 42 Whorled Lousewort. *Pedicularis verticillata*.
 43 Dull Red Lousewort. *Pedicularis recutita*.
 44 Tuberos Lousewort. *Pedicularis tuberosa*.
 45 Leafy Lousewort, x ♀. *Pedicularis foliosa*.
 46 Yellow Lousewort. *Pedicularis oederi*.
 47 Alpine Bartsia. *Bartsia alpina*.
 48 Common Butterwort. *Pinguicula alpina*. Cass.
 49 Alpine Butterwort. *Pinguicula vulgaris*.
 50 Bird's-eye or Mealy Primrose. *Primula farinosa*.
 51 Viscous Primrose. *Primula viscosa*. All.
 52 Alpine Snowbell. *Soldanella alpina*.
 53 Dwarf Snowbell. *Soldanella pusilla*. Baumg.
 54 Heart-leaved Globularia. *Globularia cordifolia*.
 55 Reticulated Willow. *Salix reticulata*.
 56 Small White Butterfly Orchid. *Carloglossum albidum*. Hartm.
 57 Spring Crocuses. *Crocus vernus*. Wulf.
 58 May Lily. *Smilacina bifolia*. Desf.
 59 Alpine Lily. *Paradisica liliastrum*. Bert.
 60 White Veratrum. *Veratrum album*.

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 87 The Alpine Aster. *Aster alpina*.
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 17 *Agaricus campestris*, advanced stage.
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 20 *Hypholoma sublateritius*, showing detail.
 21 *Coprinus atramentarius*.
 22 " " detail life size.
 23 " " Mature cap decomposing
 24 " " *comatus*.
 25 *Boletus chrysenteron*.
 26 *Bolyporus squamosus*.
 27 " " showing cap large scale.
 28 " " showing cap underside.
 29 " " showing its evolution.
 30 Specimen of imbricated *Polyporus*.
 31 *Polyporus epileucus*.
 32 *Fomes applanatus*.
 33 *Fomes applanatus* on blasted tree.
 34 *Polystictus velutinus*.
 35 " " showing cap.
 36 *Poria vaporaria*.
 37 " " extending down bark of living beech-tree.
 38 *Peniophora rosea*.
 39 *Peniophora querina*.
 40 *Stereum purpureum*.
 41 *Clavaria vermicularis*.
 42 *Clavaria cristata*.
 43 *Auricularia mesenterica*.
 44 *Auricularia mesenterica*, detail.
 45 *Tremella foliacea*.
 46 " " showing detail.
 47 *Tremella fimbriata*.
 48 *Lycoperdon gemmatum*.
 49 *Lycoperdon perlatum*.
 50 " " gemmatum and *L. echinatum*.
 51 Mycelium of Puff Ball, showing first stage of growth underground.
 52 *Uthypallus impudicus*. The "egg" of.
 53 " " The stem.
 54 " " Its natural habitat.
 55 *Peziza vesiculosa*.
 56 *Peziza badia*.
 57 *Otidea aurantia*.
 58 *Xylaria Hypoxylon*. Example of *Ascophora*.
 59 *Xylaria polymorpha*.
 60 *Bulgaria polymorpha*.
 61 *Bulgaria polymorpha* on oak log.
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| 4 " " lime (<i>Tilia argentea</i> var. <i>canadensis</i>). | 30 " " " " " of Scots pine. |
| 5 " Terrace " branch of cedar (<i>Cedrus libani</i>). | 31 Bole of Scots pine. |
| 6 Diagram of development of a sapling into typical tree forms. | 32 A pine-wood. |
| 7 Example of conical form—Turkey oak (<i>Quercus cerris</i>). | 33 Pine-crowns from below. |
| 8 " " domed crown—old horse-chestnut (<i>Æsculus hippocastanum</i>). | 34 A wood on a windy promontory. |
| 9 " " cylindroid form—young horse-chestnut. | 35 Wind-pruned hawthorns (<i>Crataegus oxyacantha</i>). |
| 10 " " cylindroid form—Lawson cypress (<i>Chamaecyparis lawsoniana</i>). | 36 Marble-galls on oak (caused by <i>Cynips kollarii</i>). |
| 11 Comparison of mode of growth of leading-shoots of wych-elm (<i>Ulmus glabra</i>) and sugar-pine (<i>Pinus lambertiana</i>). | 37 Oak-apples. |
| 12 Young Austrian Pine (<i>Pinus laricio</i>). | 38 Abortion of twig of lime-tree. |
| 13 Diagram of mode of development in which position of leading-shoot is usurped by lateral-shoots. | 39 " Witches'-brooms " on hawthorn (caused by <i>Exoascus crataegi</i>). |
| 14 Example—young horse-chestnut. | 40 Weeping willow (<i>Salix babylonica</i>). |
| 15 Example—old apple-tree (<i>Pyrus malus</i>). | 41 Branches of weeping willow. |
| 16 Evolution of "umbrella" form illustrated by Scots Pine (<i>Pinus sylvestris</i>). | 42 Weeping birch (<i>Betula alba</i> var. <i>pendula</i>). |
| 17 A Symmetrical tree (after Ruskin). | 43 Weeping box (<i>Buxus sempervirens</i> var. <i>pendula</i>). |
| 18 Long-shoots and dwarf-shoots of wild cherry (<i>Prunus avium</i>). | 44 Weeping beech (<i>Fagus sylvatica</i> var. <i>pendula</i>). |
| 19 Three-years' growth of twig of lime (<i>Tilia europæa</i>). | 45 Lombardy poplar (<i>Populus nigra</i>). |
| 20 Dormant buds on horse-chestnut twigs. | 46 Diagram of fastigate branching. |
| 21 Dormant buds on trunk of red oak (<i>Quercus rubra</i>). | 47 Fastigate branches of Lombardy poplar. |
| 22 Coppice in winter. | 48 Fastigate branching of Lawson cypress. |
| 23 Three stages of growth of sweet-chestnut coppice (<i>Castanea sativa</i>). | 49 Fastigate yew (<i>Taxus baccata</i> var. <i>fastigiata</i>). |
| 24 Mixed coppice in summer. | 50 Fastigate or cypress oak (<i>Quercus pedunculata</i> var. <i>fastigiata</i>). |
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| 26 Suckers at base of common elm (<i>Ulmus campestris</i>). | 52 The birch growing as a shrub. |
| | 53 The elder (<i>Sambucus nigra</i>) as a tree. |
| | 54 Diagram of old horse-chestnut branch. |
| | 55 Characteristic branch of horse-chestnut. |
| | 56 Terminal twigs of horse-chestnut branch. |
| | 57 Horse-chestnut branches. |
| | 58 Tortuous branches of oak. |
| | 59 Twig of oak showing origin of tortuous branches. |
| | 60 Crooked lilac-twig. |
| | 61 Tortuous branching of purple willow (<i>Salix purpurea</i>). |
| | 62 Diagram illustrating "fountain" branching. |
| | 63 Fountain branching of hawthorn. |
| | 64 Fountain branching of <i>Philadelphus latifolius</i> . |

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| 12 Beeches at Epping. | 36 Edelweiss growing on rocks near Arolla. | 54 " in Leaf. |
| 13 Butter Tree and Fruit. | 37 Elms. | 55 " in Winter. |
| 14 Camphor Tree. | 38 Elms and Oaks. | 56 Owen Glendower's Oak. |
| 15 Caoutchouc Tree. | 39 Euphorbia Tree in Angola. | 57 Olive Tree, Gethsemane. |
| 16 Carnivorous Plants, <i>Sarracenia</i> , <i>Nepenthes</i> , and <i>Darlingtonia</i> . | 40 <i>Ficus Elastica</i> in the Peradeniya Gardens, Kandy. | 58 Palm, African, <i>Zamia Caffra</i> . |
| 17 " <i>Dianthus</i> , <i>Penquicula</i> , and <i>Drosera</i> . | 41 Gamboje Tree. | 59 " Medicinal Aloe, <i>Mada-gascar</i> . |
| 18 " <i>Cephalotus</i> . | 42 Gentian (see also <i>Rhododen-dra</i>). | 60 Palm, <i>Coccaput</i> . |
| 19 Cedars of Lebanon. | | 61 " <i>Coccaput</i> , and Fruit. |
| 20 Great Cedar of Lebanon. | | 62 " Date. |
| 21 Chestnut, Great Tree of Mount Etna. | | 63 " <i>Dôm Luxor</i> . |
| 22 Thyrus of Flowers of the Yellow Cinchona. | | 64 " Dwarf, Forest Scene, Madagascar. |
| 23 Cinnamon Tree. | | 65 " Ivory, Nut and Fruit. |
| 24 Cocoa Tree. | | 66 " Wine-bearing Sago. |
| | | 67 " Talipat. |
| | | 68 " Talipat, 1st, Stage. |
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|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|
| Palm, Tarapote, <i>Triarlea ventricosa</i> . | 81 A Group of Primroses (very fine). | 89 Soldanella alpina L.; <i>Leontopodium alpinum</i> Cass. |
| 70 " Travellers'. | 82 Rose Leaf cut by a Leaf-cutting Bee. | 90 Tanghien Tree of Madagascar. |
| 71 " Wax, <i>Ceroxylon andicola</i> . | 83 <i>Rhododendron ferrugineum</i> L.; <i>Gentiana bavarica</i> L.; <i>Gentiana ulvalis</i> L.; <i>Gentiana acaulis</i> L. | 91 Tea and Coffee Plants, China. |
| 72 Pansy (<i>Viola</i>). | 84 The Large Flowering Sensitive Plant. | 92 Alpine Thistle. |
| 73 Papyrus. | 85 Sensitive Plant, Asleep and Awake. | 93 Traveller's Tree, <i>Urania speciosa</i> . |
| 74 Prickly Pear and Cochineal Insects. | 86 Snow on Hedge. | 94 Tropical Scenery, Venezuela. |
| 75 Pitcher Plant. | 87 " on Trees. | 95 Upas Tree, Java. |
| 76 " Cluster. | | 96 Varnish Tree. |
| 77 " and Venus's Fly-trap. | | 97 Victoria Regia, the Great Water Lily. |
| 78 The Pomegranate. | | |
| 79 Pine Tree at Arolla. | | |
| 80 A Primrose Bank. | | |
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|-----------------------------------|-------------------------------------|---------------------------------------------------------------|
| 98 Fringed Violet. 2s. 9d. | 112 Mango Tree. | 123 Palmyra Palm in Blossom. |
| 99 White Cactus. 2s. 9d. | 113 Screw Pine Palm. | 124 Kukui or Candie Nut Trees |
| 100 Australian Tree Fern. 2s. 9d. | 114 Tall Nikee Palm. | 125 Wild Flax and Pampas Grass |
| 101 Trumpet (reaper). 2s. 9d. | 115 Eucalyptus Tree (Blue Gum). | |
| 102 White Hyacinth. 2s. 9d. | 116 Variegated Bananas. | 126 Wild Fig Tree. |
| 103 Silver Birch. | 117 Lemon Tree at Suva. | 127 Trained Pine Tree at Negishi. |
| 104 Beeches. | 118 Orange Ranch and Pepper Trees. | 2s. 3d. |
| 105 Weeping Willow. | 119 Canadian Crah Apple in Blossom. | 128 Cuckoo-pint. |
| 106 Cork Trees. | 120 Tamarind Tree. | 129 Mountain Ash. |
| 107 Para Rubber Tree. | 121 Peepul Tree. | 130 Sequoia or Wellingtonia (the Mammoth Tree of California). |
| 108 Pineapple Plant. | 122 Papaya Tree. | 131 English Pine Tree. |
| 109 Sycamore Tree, Jericho. | | |
| 110 Cherry Blossom. 2s. 3d. | | |
| 111 Silver Leaf Trees. | | |

LANTERN SLIDES SENT ON APPROVAL.

Messrs. NEWTON will be glad to send any number of Slides on approval for purchase to Customers who may find themselves unable to attend the Lantern Slide Gallery to make their own selections.

Customers will be charged with the cost of Carriage only, but be held responsible for the safety of the Slides until received back by Messrs. NEWTON.

VR THE GROWTH, STRUCTURE, DEFECTS AND CONVERSION OF TIMBER.

A Series of Lantern Slides taken from Actual Specimens of Wood, selected and prepared by Mr. HAROLD BUSBRIDGE, A.R.I.B.A., A.R.C.S., Chief Lecturer in Building Trade Subjects at the Goldsmiths' Institute, and at the L.C.C. Paddington Technical Institute.

Nos. 25 to 29 are taken from specimens in the Natural History Museum, South Kensington, by kind permission of the Curator.

Plain Slides 2s. 3d. each

A scale of inches is photographed with each specimen, so that its approximate dimensions can at once be ascertained from the picture on the screen.

In addition to the common name of each specimen, the correct botanical name of the species is placed in the photograph, so as to be easily read when thrown upon the screen.

The Growth and Structure of Stems.

- 1 Endogenous Stems, showing nodes in elevation and section
- 2 Stem of Exogen (Araucaria) showing nodes
- 3 Trunk of Exogen (Mulberry) showing lurr
- 4 Cross section of Oak log showing annual rings, bark, heart and sapwood, and medullary rays
- 5 Cross section of Pitch Pine showing pith and annual rings
- 6 Cross-section of Cocus-wood, showing heartwood and sapwood
- 7 Various woods (radial sections) showing heart and sapwood
- 8 Radial sections of Alder and Chestnut, showing pith
- 9 Cross-section of Yellow Deal, showing node (five knot.)
- 17 Willow (four specimens from same tree) showing foxiness and the progress of decay
- 18 Cedar, showing rind-gall
- 19 Fir timber destroyed by dry rot (two specimens)
- 20 Fir timber covered with dry rot fungus
- 21 Fir timber destroyed by wet rot
- 22 Ash, showing heart shake
- 23 Ash, showing decayed heart, and starshake
- 24 Ash, showing ravages of dorcus parallelipipedus
- 25 Pine, showing ravages of sirix juvenous
- 26 Larch, showing ravages of wood wasps (siricidae)
- 27 Wood, showing ravages of white ants (termites)
- 28 Elm, showing ravages of "ship 's-worms' (toredo)
- 29 Elm, showing starshake and inhark

The Conversion and Shrinkage of Timber (cross sections).

- 35 English cherry seasoned in the log with bark on
- 36 English Cherry seasoned in the log with bark stripped
- 37 English Cherry seasoned in square balk
- 38 Eng' h Cherry seasoned in half-logs
- 39 English Cherry seasoned in quarters
- 40 English Cherry seasoned in planks each side of centre
- 41 English Cherry seasoned in plank containing the centre
- 42 English Cherry seasoned in planks cut radially

Characteristics of Various Useful Woods.

- 43 Yellow Deal showing typical grouping of knots
- 44 White Deal showing typical grouping of knots
- 45 Larch, showing typical grouping of knots
- 46 Differences in Yellow Deal caused by climate, soil, etc.
- 47 Three samples of various American Pines
- 48 Oak, Horse' Chestnut and Sweet Chestnut, showing differences in grain
- 49 Cuban, Spanish and Honduras Mahogany, showing differences in grain
- 50 White and Honduras Mahogany, showing difference in colour
- 51 American Yellow Pine, showing dark hair marks
- 52 White Deal showing resin cavities

The Defects of Timber.

- 10 Two specimens showing warping due to twisted grain
- 11 Yellow Deal, showing cup-shakes
- 12 Honduras Mahogany, showing upsets
- 13 Yellow Pine, showing loose knot
- 14 English Apple Tree showing druxy knot
- 15 Birch, showing druxy knot and dotiness
- 16 Beech, showing destruction caused by worms

The Causes of Figure in Ornamental Woods.

- 30 Four specimens showing figure produced by annual rings
- 31 Three specimens showing figure produced by medullary rays
- 32 Two specimens showing figure produced by knots or eyes
- 33 Three specimens showing figure produced by wavy grain
- 34 Three specimens showing figure produced by wavy grain

ADDITIONAL SLIDES OF "DEFECTS IN TIMBER."

- 53 Spruce Fir, showing Pith.
- 54 Pinus Sylvestris, showing Pith.
- 55 English Oak, showing Pith, Heart Strake.
- 56 Ash with Decayed Heart.
- 57 Pear Tree. Healing of Wounds by occlusion leading to Druxy Knot.
- 58 Pear Tree. Healing of Wounds by occlusion leading to Rind Gall.
- 59 Yellow Deal, showing Rind Gall.
- 60 Spruce Fir, showing Spiral Grain.
- 61 Pinus Sylvestris, showing alternating Spiral Grain.
- 62 Teredo Navalis, preserved in Alcohol.
- 63 Mahogany bored by Teredo Navalis.
- 64 The Goat Moth (Pupa, Larva, and Moth).

- 65 Poplar bored by Larvae of Goat Moth.
- 66 White Ants (Soldier, Worker, and Male).
- 67 Wood bored by White Ants.

CAUSES OF FIGURE IN WOOD.

- 68 Mahogany. Curl from Fork between Branches.
- 69 Maple. Bird's-eye caused by Pittings.
- 70 Maple. Mottling caused by small Patches of Cross Grain.
- 71 Walnut. Burr Figure caused by Irregular Grain.
- 72 Oak. Pollard Figure caused by Knots or Eyes.
- 73 Ash. Pollard Figure caused by Knots or Eyes.

For Slides on the Lumber Industry, see Industries, Section 7, and on Wood Carving, see Architecture, Section 8 of this Catalogue.

TERMS AND CONDITIONS

OF

HIRE OF SLIDES.

Separate slides may be selected from most of the sets in the Catalogue and hired at 3s. per dozen (minimum charge) for the first evening, and 1s. per doz. for each additional evening's use.

For the convenience of hirers it is usual to despatch slides two days before the actual date of Lecture without additional charge, and they should be returned by the first post or by passenger train the morning after use. If the slides are retained beyond this time an extra charge of 1s. per dozen for each day is incurred.

The hirer is responsible for the safety of any slides borrowed, till received back by Messrs. Newton.

Transit Risk Fee:—An extra fee of 4d. is charged which covers all risk in transit.

SUBSCRIPTION RATES.

The ordinary hiring charge is at the rate of 3s. per dozen (as above), but Slides can be loaned under any of the following subscription rates:—

- £2 2s. payable in advance for Slides, at 2s. 6d. per dozen.
 - £3 3s. payable in advance for Slides, at 2s. per dozen.
 - £5 5s. payable in advance for Slides, at 1s. 6d. per dozen.
-

Messrs. Newton will be glad to quote other favourable contract rates for larger quantities of slides if desired.

Subscriptions are payable in advance, and are placed to the credit of the hirer.

In the event of any balance of subscription remaining at the end of 12 months from date of payment, Messrs. Newton are pleased to transfer such balance to another year so that the entire subscription may be reserved for the use of the hirer.

Postages, Transit risk fees, and loan or sale of Readings are charged separately.

There are certain sets in the Catalogue to which the foregoing terms do not apply; in such cases the hiring charge is clearly stated at the headings of the various sets.

Orders for slides, etc., are booked in advance, without extra charge, but as the clerical labour in the Hiring Department is a very heavy item, we are compelled to charge a fee of 1/- for every postponement of date or cancellation of order.

LANTERN SLIDES.

Owing to our specializing in the production of Lantern Slides we have attained a standard of work which is unequalled in quality, and as we make use in our London Studios of several private processes, we are able to suit the process to the subject, so that our slides are mostly far superior to the usual trade productions, being clearer, brighter, sharper in definition, more transparent and more artistic.

In the same way our painting, being done by a large staff of the finest slide artists of the day, employed exclusively on our work, and using processes invented and perfected by ourselves, is of a class unobtainable elsewhere.

Slides made from Negatives, Photographs, Prints, etc.:—

PRICES.

From Negatives by contact or reduction	2/- per slide.
" Photographs, Book Illustrations, etc.	3/- "

Special quotations for quantities.

Slides made in warm brown art tones at an additional cost of 6d. per slide

PHOTOGRAPHIC PRINTS.

Our Studios are fitted with the most modern appliances for Photographic work. Films developed. Printing from negatives in art tones. Enlargements made.

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Photographers sent out for special work.

SALE OF SLIDES.

Special discounts are allowed to Educational Institutions.

COLOURED SLIDES.

CHEAP SERIES.

If it is desired to purchase slides at a lower rate than the best coloured prices quoted at the headings of the various sets in the Catalogue, Messrs. NEWTON are able to supply them well coloured at 5/- to 6/6 each.

Customers' own slides can be painted in this cheaper series at prices varying from 3/- each.

LIGHT WOODEN VARNISHED SLIDE BOXES.

These are very strong, light, and cheap; they are made in two sizes, and the straps are fixed so as to prevent their being lost.

No. 50, to hold about 40 slides, with strap and buckle	£0 2 3
" 51, to hold about 60 slides, with strap and buckle	0 3 0

GROOVED WOODEN SLIDE BOXES.

With dovetailed corners and numbered grooves, brass hinges, and two catch fastenings, index label in lid; cleanly finished. To hold 24, 36, 50, 60 or 100 Slides.

Prices on application.

PADDED WOODEN SLIDE BOXES.

AS MADE FOR THE LONDON COUNTY COUNCIL.

75. Varnished Oak or Mahogany Slide Boxes, with divisions, safety hook, felt packings, carrying strap going all round box, extra strong for travelling; 3-space for 50 slides, 13s. 6d.; 4-space for 70 slides, 15s. 6d.

NEW TRAVELLING BOX.

ATTACHÉ PATTERN.

This is made similar to an attaché case, and in two sizes. Lined felt throughout; leather handle and safety hooks. In either mahogany or oak.

85 Small size, to carry 120 slides	£1 1 0
86 Large size " 160 "	1 7 6

CHEAP LANTERN SLIDE TRANSIT BOXES.

105	Blackened Whitewood, to hold about 60 slides, with three cloth-covered divisions, felt top and bottom pads to guard against breakage, and strong leather strap for carrying	each	£0	7	6
106	Ditto, to hold 100 slides	"	0	10	6
107	In polished mahogany, for 60 slides	"	0	10	6
108	Ditto, for 100 slides	"	0	13	6

"NEWTONIAN" SAFE-TRANSIT DESPATCH BOX.

Patent 11835.

DESCRIPTION.—Varnished Wooden Box, with Strap-handle. An inner light wooden box contains the Slides, and rests upon straps fastened on the four inner sides of the outer box. Made in two sizes; to carry about 40 Slides, 15s. 0d.; to carry about 60 Slides, 16s. 6d.

The prices include the inner box and straps.

For those who prefer to have their Slides in one of the ordinary wooden boxes, a similar varnished and padded outer case with strap can be supplied, which takes a box 12 in. by 4½ in. by 4½ in. Price, 13s. 6d.

This price does not include the inner box.

LANTERN SLIDE CABINETS.

The most convenient way of storing slides is in Cabinets containing as many drawers as are required. These are well finished in varnished whitewood; each drawer holds about 60 slides. They are also supplied in dark polished oak, the drawers being of whitewood, faced with oak.

Similar Cabinets can be supplied with any number of drawers, and, if desired, combined with a cupboard or shelves below to contain oddments and books of lectures, &c. Prices can be quoted when we know the exact requirements.

			In Whitewood.	In Dark Oak.
125	CABINET, comprising 4 drawers	£1	7	6
126	CABINET, comprising 6 drawers	1	17	6
127	CABINET, comprising 9 drawers	2	5	0
128	CABINET, comprising 12 drawers	2	15	0
				3 3 0

Full details of other boxes supplied will be sent on application.

MATERIALS FOR MAKING AND COLOURING SLIDES.

180	Transparent Notice Plates, for writing with ordinary pen (1 doz. n box)	£0	1	6
181	Opaque Notice Plates, for scratching with hard needle (1 doz. in box)	0	1	6
183	Lantern Size Dry Plates per packet of 1 doz.	0	2	3
184	Cover Glasses for ditto, specially selected per doz.	0	1	0
185	Box of Lantern Masks	0	1	6
186	Packet of Binding Paper	0	1	6
187	Box of White Paper Spots, for marking slides	0	0	9
188	Numbers for putting on slides, 1—50.. .. .	0	0	9
190	Glass Painting, transparent colours and materials for painting lantern slides, tubes of moist colours, spirit, spatula, medium, brushes, palette, &c., in case	Prices on application		

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